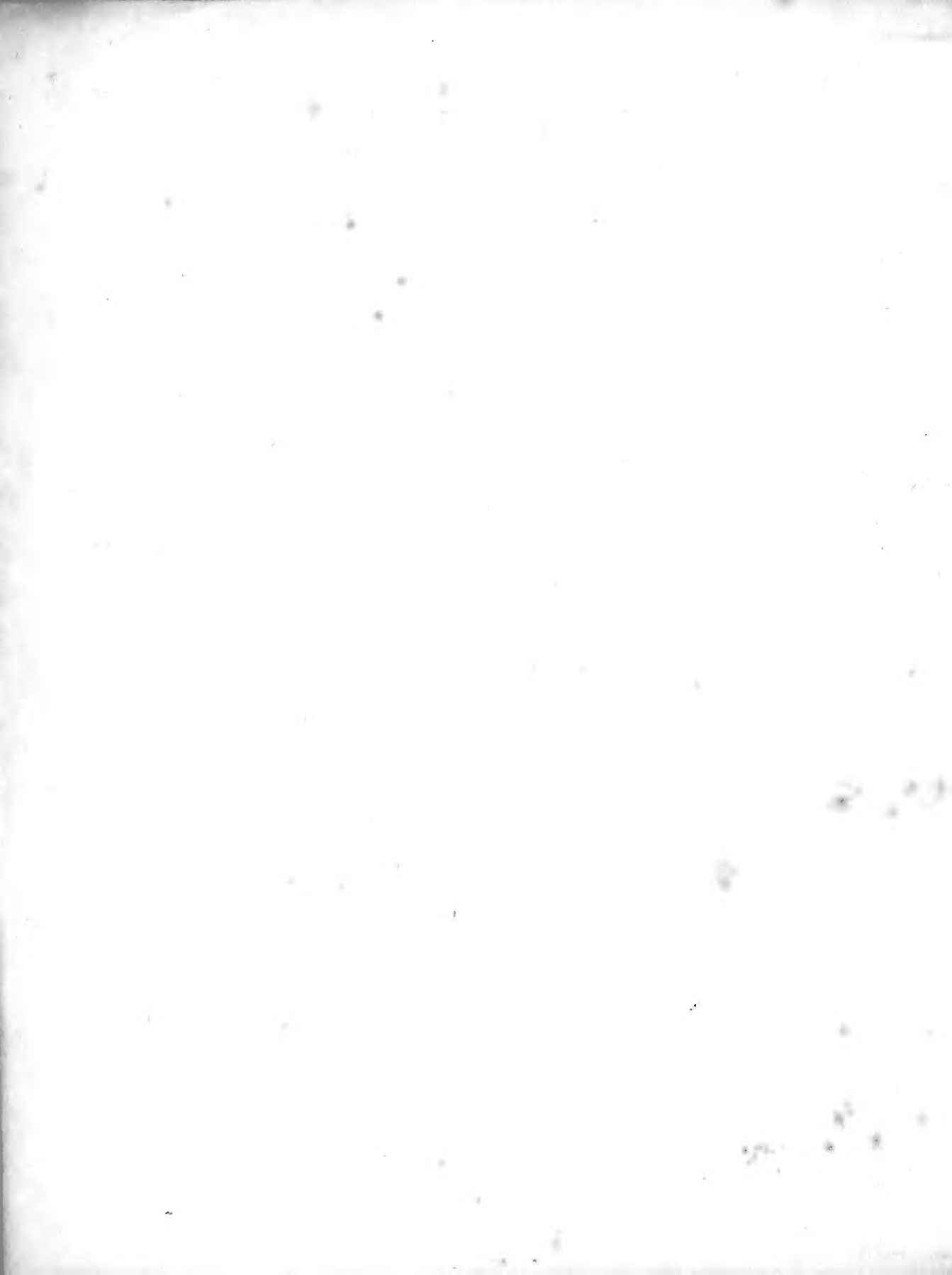


Frederick C. Fowler.







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Frederic C. Fowler

BRITISH CONFERVÆ;

OR

COLORED FIGURES AND DESCRIPTIONS

OF THE

British Plants

REFERRED BY BOTANISTS TO THE GENUS

CONFERVA.

By LEWIS WESTON DILLWYN, F.R.S. & F.L.S.

LONDON:

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1809.

T O

DAWSON TURNER, Esq. A.M. F.L.S.

MEMBER OF THE IMPERIAL ACAD. NAT. CURIOSORUM,

AND OF THE

GOTTINGEN PHYSICAL SOCIETY,

THIS WORK,

AS A TOKEN OF SINCERE REGARD, AND A PUBLIC ACKNOWLEDGMENT

OF THE GREAT ASSISTANCE IT HAS RECEIVED FROM HIM,

IS RESPECTFULLY INSCRIBED.



PREFACE TO THE FIRST FASCICULUS.

THE present very imperfect state of our knowledge of *Conservæ*, will, I hope, be accepted as sufficient apology for not prefacing my first Fasciculus with any general remarks on that genus. Convinced of this deficiency, I offer the present work as little more than a set of drawings, whereby the species of this intricate tribe may be, in some measure, fixed; and which may at least serve as materials for the future labours of some more able Botanists. I shall add to each plate the description of the plant it is intended to represent, pointing out at the same time whatever has struck me as most remarkable in its conformation or physiology.—The greater part of the more minute species resemble each other so much in their natural state, that the microscope alone can enable us to distinguish them, and therefore I have given only magnified sketches; except of those, in which the structure or ramification is sufficiently singular to point them out, at first sight, to the naked eye.

If the botanical world should approve of this undertaking, my plan is to publish a similar Fasciculus every four months, by which means there will be sufficient time to examine accurately the plants I introduce. It is impossible yet to offer

a conjecture to what extent the work will reach; at present I have only examined, and that imperfectly, the environs of London, Yarmouth, and Dover, but from what I have seen in these places, I am convinced that the Confervæ are a far more numerous tribe than is in general imagined. I solicit the assistance of other Botanists, and shall receive with thanks any remarks tending to elucidate either the species previously described, or those which still remain to be introduced. I only beg leave to say, that these plants must not be judged of from dried specimens; for when the granules in their interior substance once collapse, no subsequent immersion will restore them to their former appearance, or bring back the elasticity they possessed when recent. To give as accurate an idea as possible of the relative size of each plant, it appeared best to state, after every figure, with what power the drawing was made; the numbers, therefore, denote the several magnifying powers of a common compound microscope.

Higham Lodge, Walthamstow,

June 1st. 1802.

INTRODUCTION.

SECT. I.

GENERAL REMARKS.


THE Confervæ, whether considered with regard to their external appearance, their internal structure, or the extraordinary manner in which the propagation of many species is effected, may undoubtedly be reckoned among the most beautiful and curious of the order of vegetables to which they belong. It was my original intention to have given in this work a magnified drawing of each British species, but the number of those already discovered is so great, and it is so impossible to obtain specimens of all sufficiently recent for the purpose, that I find it a task almost endless, and above my ability to complete. I have therefore been obliged to content myself with giving a brief account, by way of synopsis, of nearly all those species which have fallen under my observation*, and a drawing, accompanied with a more full description, of most of those which I have met with recent, and which have not been figured

* Since this was written, I have been induced so far to deviate from what I had here proposed, as to give a slight sketch (generally from dried specimens) of all the species not figured by other authors, excepting *C. sanguinea*, which would not revive sufficiently in water to enable me to trace its structure.

elsewhere. In this state I offer the result of my labors to the Botanic world, in hopes that its numerous defects will be excused; when it is considered that the *Confervæ* were very lately involved in such obscurity as to have been publicly termed ‘the opprobrium of Botany.’*

If we look back to what had previously been done in this department of science, we shall find that Linnæus was too busily engaged in the immense field he had entered on, to spare the time necessary for an investigation of the submerged Algæ, as appears both from his writings and Herbarium, in which latter scarcely any specimens of *Confervæ* are preserved. In the *species Plantarum*, and also in the works of most other authors, the subject is treated so slightly, that many different plants may not only be often referred to the same description, but were actually designed by the writers to be included under it, and even these short descriptions are chiefly borrowed from Dillenius, who remained almost the only original author on the *Confervæ*, till Dr. Roth published the first Fasciculus of his *Catalecta Botanica*, in 1797. Even of Hudson’s descriptions in the *Flora Anglica*, many are entirely borrowed from the *Historia Muscorum*, and those which he has taken from his own observations are too short to be of much service. Lightfoot, indeed, when he relied upon himself alone, is perhaps more than any other author exempt from such a charge, and the only thing to be lamented in this excellent Botanist is, that he allowed himself so often to transcribe the works of others, who were far inferior to himself in the art either of observing or of recording their observations. Had Dillenius accustomed himself to the use of a microscope, there is little that might not have been expected from his accurate pencil; but, for the want of this assistance, he has frequently confounded several species together, which agree only in external habit, and has even described some as jointless in which dissepiments are readily observable with a common glass. The only magnified drawings of *Confervæ*, to which reference with any tolerable precision could be made prior to the close of the last century, were those of Mr. Ellis, in the 56th volume of

* Dr. Smith’s Introductory Discourse, *Lin. Trans.* I. p. 34.



the Royal Society's Transactions; and those of Muller, in the *Flora Danica* and *Nova Alta Petropolitana*; in which works these distinguished naturalists have displayed their accustomed accuracy and talent for minute investigation. Such being the case, I trust that this work, by elucidating the synonymy of these, as well as of the more modern authors, and by the variety of new matter it contains, will be found so far to clear the way as to induce others, with more leisure and ability than myself, to pursue the study, and perfect our knowledge of a tribe than which none will be found more interesting. The pursuit, though not otherwise of high importance, tends, as Dr. Smith observes, 'to enliven the scenes of rural retirement, to relieve the mind amid the busy pursuits of active life,' and carries with it its own reward in the constant source of amusement which it presents to the student wherever he goes, and in the complacency which an investigation of the works of nature never fail to excite in the mind, besides the higher object of teaching man to admire and adore his Maker in the works of his hand.

M. Girod Chantrons, in his *Recherches sur les Conferves*, has, both by chemical analysis, and by observations on their structure, endeavoured to prove that the *Confervæ* are either real animals or of animal origin; and that many of them are actual Polypi, others the habitations of these animals, and others again, aggregations of Polypi, so attached together as to form a tube. It appears to me, so far as I am able to judge from the drawings and descriptions, that this work is too inaccurate to merit much attention. Dr. Treviranus, in his *Biologie**, has gone still further, and proposes to unite, not only the *Confervæ*, but the whole class Cryptogamia with the Zoophytes, and thus form a fourth kingdom, intermediate between the animal and vegetable. I cannot help suspecting that these authors have given too much scope to their imagination, and the more so, as a similar analysis by M. Vauquelin, has been attended with such different results, as to confirm him in the opposite and generally

* This work, which I have not myself seen, is wholly quoted on the authority of Sprengel's *Introduction to Botany*.



received opinion. He found that the small quantity of ammonia contained in *Conferve* is combined with pyromucous acid, which is the case in many vegetables: that they do not give out muriate of soda, as Messrs. Chantrons and Lacroix have affirmed, but muriate and carbonate of potash, and if they had contained soda, this is only what occurs in several other plants. He considers the quantity of ashes they afford as a still further proof, and upon the whole entertains no doubt that their substance is truly vegetable.* M. Decandolle has also, in my opinion, successfully controverted M. Chantrons' theory; and I therefore need only add, that I have never discovered an appearance in any of the Algæ which occasioned the least suspicion in my mind that they are not true and perfect vegetables.

With regard to the present arrangement of the *submersed Algæ*, I have little more to add than that nothing can more fully evince our ignorance respecting them, or shew how imperfectly they have been hitherto studied, than the circumstance of so many discordant species being placed together, as those of which the present genera are composed. It may probably be expected, that in a work of this kind I should attempt some better arrangement, but, though satisfied of the necessity of such a task, I can only lament my inadequacy to the execution of it: the time is not yet arrived; sufficient materials are not yet collected; and it should be deferred not only till the *Conferve*, but also till the *Fuci*, *Ulve*, and *Tremellæ* are better known, as well with regard to their fructification as to the number of their species; for many are still frequently discovered, differing essentially in their modes of propagation from those before known. Crude and undigested attempts at reformation serve in Botany, as in other matters, to perplex rather than to enlighten, and I will therefore add nothing further on this subject, than that I fully agree with my friend Mr. Turner, that, previously to any permanent system being established, it will be necessary to reduce the present genera into one mass, and proceed in nearly the same manner as if nothing had been done before.

* Journal de Physique, liv. p. 127.

The *Conservæ* have hitherto been considered as principally distinguished from other *Algæ* by the jointed structure of the filaments; but this circumstance is not of itself sufficient to separate them from many of the *Fuci*, nor even perhaps from some of the *Lichens* and *Fungi*.* There are also several plants which have by the general consent of Botanists been always called *Conservæ*, in which no joints are observable, so that, if, in addition to what is here observed, be added the many remarks upon the same subject that occur in the present work, and in Mr. Turner's admirable *History of the Fuci*, (particularly in his description of *F. dasyphyllus*) it appears sufficiently proved that the jointed structure can no longer be used as a distinctive generic mark. Indeed the *Conservæ* must be regarded rather as a natural family, comprehending many genera of plants than as a single genus, and I have therefore felt it would be absurd, as well as unnecessary, to attempt such a generic character as would comprise the whole, because, according to the rules of botanical philosophy, this should be formed from the fructification, and the fructification of the *Conservæ* differs so infinitely in different species, that it would be impossible to include them all under any such description. I have, however, for the present, retained *Conserva* as a general name for all those plants which have been, or which if known, would have been so called by preceding authors, in the same manner as the term *Lichen* was applied by Dr. Acharius, in the *Prodromus* of his *Lichenographia Suecica*. To these I have also added the *Byssi filamentosæ*, as they differ in no respect from the *Conservæ* in structure; and since the publication of my description of *C. aurea*, the propriety of this union has been established by a discovery of its capsules, which resemble those of Dr. Roth's *Ceramia*.

Drs. Ingenhouz and Girtanner, from the general prevalence of *Conservæ* in almost all waters and moist places, have been led to suppose that they are generated spontaneously from the decomposition of water by the solar rays; but

* Since I published the description of *C. atro-virens*, Mr. Hooker has ascertained that it is *Conicularia pubescens* of Acharius, but the capsules which I discovered in July, 1806, near Beddgelart, prove that it belongs to the *Conservæ*. *Fibrillaria ramosissima* of Sowerby's English Fungi, as well as some other species of the same genus, and of the *Auriculariæ*, are links which connect the latter tribe with the *Conservæ*.

“omnia ex ovo” is now so universally received as an axiom, that few naturalists will be likely to accede to their opinion. In some *Confervæ*, indeed, no mode of propagation has hitherto been discovered, except by an elongation or expansion, and viviparous division of the filament; but analogy induces me to suspect that even these are also propagated by seeds, as has been ascertained to be the case in most of the other species.

Of the extent of this tribe I feel myself unable to offer a conjecture: more than two hundred different species have been already ascertained in the few parts of Europe in which the *Confervæ* have been at all examined, and I have no doubt but that even our own Islands will be found to produce a still larger number. In my *Synopsis* I have been obliged to omit several species, with specimens of which I have been favored by my friends, because the latter are so imperfect, or have suffered so much change from drying, that it is impossible to obtain their distinguishing characters. In addition to the species which have fallen under my own observation, or of which such drawings or descriptions have been published as to leave no doubt of their identity, I have admitted only those of which I possess either sketches or specimens, sufficiently perfect to afford a tolerably correct idea of the recent plant. The accuracy, however, of all descriptions of *Confervæ*, which are taken from dried specimens, for reasons assigned in the preface to my first Fasciculus, may be doubted, and I therefore, whenever this has been the case, have prefixed an asterisk to the name of the species, in order that a proper allowance may be made.

The *Confervæ*, by the large quantity of oxygen that they give out, have been thought to render the air about stagnant waters more wholesome; but of their use and economy no more is yet known than of their number. Many species remain of whose whole physiology we are intirely ignorant, and perhaps no other tribe can be found which still offers so wide a field for discovery.

Of those who have attempted a division of the *Confervæ* into Genera, Dr. Roth and M. Vaucher are the authors who deserve particular attention, and I shall now proceed to give a sketch of their different arrangements.

SECTION II.

SYSTEM OF ROTH.

DR. ROTH has divided the submersed Algæ into the following Genera: *Fucus*, *Ceramium*, *Batrachospermum*, *Conferva*, *Mertensia*, *Hydrodictyon*, *Ulva*, *Rivularia*, *Linkia*, and *Tremella*. I shall give the outline of each of these, and offer a few remarks on those that contain any of the plants usually denominated *Confervæ*.

FUCUS.—*Vesiculæ aggregatæ, substantiæ frondis immersæ, poris mucifluis præditæ.*

This genus, of which the definition is as vague and unmeaning as the same number of words can well be, is intended to comprehend a part only of the plants usually called by the name of *Fuci*, the remainder having been referred to the following.

CERAMIMUM.—*Filo membranaceo-cartilaginea, capsulis granuliferis ipsis adnatis.*

In this genus are made two divisions; the first, '*filis conformibus*,' contains some of the more slender *Fuci*, and of the unjointed capsuliferous *Confervæ*: the other, '*filis spurie geniculatis*,' comprehends the jointed *Fuci*, and the remainder of the capsuliferous *Confervæ*. There is undoubtedly a great similarity in the fructification of the capsuliferous species, and yet several natural tribes, if not really distinct families, may be perceived among them, although, as has been already observed, the imperfect state of our knowledge, would render it imprudent to attempt at present to define their respective limits. I shall however enumerate those which appear most striking.

The unjointed species probably all belong to the genus *Vaucheria*, as will be hereafter mentioned.

C. elongata, as is observed in the description of that species, has two kinds of

capsules, similar to those of *Fucus subfuscus* and *F. pinastroides*, from which it cannot be separated without violence; and to these may probably be united the black marine, and those other species in which the filament is an aggregation of several smaller tubes; in these the capsules are ovate, reticulated, and sessile.

In *C. ciliata*, *diaphana*, *rubra*, and some others obviously similar in character, the capsules are ovate, solitary, and subtended by two or more calyciform processes.

In *C. plumula*, *rosea*, *Turneri*, and their congeners with pinnated filaments, the capsules are globose, numerous, and neither reticulated nor subtended by the abovementioned processes. The capsules of *C. littoralis*, *pennata*, *scoparia* and *tomentosa*, are nearly similar to the foregoing, but, instead of being placed on the ramuli only, at the end of almost every joint, they are scattered without order on the filaments.

The capsules of *C. spongiosa*, and also most probably of *C. verticillata*, are oblong, petiolated, and unusually small for the size of the plant.

C. setacea, *barbata*, and those which have their seeds imbedded in mucus, and guarded by an involucre instead of a capsule, form a very distinct and beautiful family, which cannot be arranged with propriety in any of Dr. Roth's genera. From the description in Mr. Turner's work, it appears that *F. plumosus*, as well as some other Fuci, may probably be found to belong to the same genus, which I had hoped to have seen at some future time, when the submerged algæ shall be remodelled, distinguished with the name of Mr. Borrer, to whose unwearied application we are indebted for our knowledge of many of its species, but I have just found that Dr. Acharius has, in his new *Lichnographia Universalis*, so called one of the new genera of his favorite family.

BATRACHOSPERMUM.—*Baccae polyspermae, coloratae, filamenta geniculata, cartilagineo-membranacea.*

In this genus two species only are enumerated, with one of which, *B. dichotomum*, I am entirely unacquainted. The other is *C. gelatinosa*, of which a description may be found in the body of this work.

CONFERRA.—*Tubuli vel filamenta herbacea internis parietibus fructificationum granulis adspersa.*

This genus, still more than Ceramium, comprises plants belonging to several natural families, perfectly distinct from each other, and the learned Doctor seems to have used it as a receptacle for all those species of which the fructification is unknown, or which he could not otherwise dispose of. They are arranged under two separate heads, "*Tubulosæ*," and "*Filamentosæ*." Of these, the former is composed of the tubular *Ulva*, the union of which with the *Conferræ* appears to me to be by no means warranted by what is at present known on the subject. The latter has three main divisions, depending on what are here termed *genicula*, but which are in the course of this work (perhaps improperly) named *Dissipiments*. I have used this word to express every sort of division between the *vesicles* or *articuli* of these plants. It would certainly be desirable to distinguish, by different names, the different natures of these divisions, but they are often so ambiguous, and in plants so minute it is necessarily so difficult to examine them accurately, that I have not ventured to undertake the task.

The only British species arranged in the first division, "*Conformes seu continuæ*," are *C. fenestralis*, *Ulva plumosa*, and *C. dilatata*, respecting which I must be allowed to remark, that this arrangement of *C. fenestralis* is erroneous, as dissipiments may be observed in the filaments when examined with the higher powers of a microscope, while *U. plumosa* is at least a plant of doubtful place in the system, and *C. dilatata* is the same with my *C. vesicata*, and should therefore in this arrangement have been placed with *C. amphibia*, among the *Ceramia*.

The second division is entitled "*Articulatæ, geniculis spuriiis*." Dr. Roth calls those dissipiments *spurious*, which have their origin in the internal structure, and not in the fibres which constitute the filament. This section is itself thrice subdivided.

The first subdivision is termed "*Sporangiorum annulis*." In these plants, Dr.

Röth supposes that the joints are in fact a series of annular seed-cases, not attached to, but disposed within the filaments, at regular short intervals from each other; and that these intervals constitute the supposed dissepiments. This subdivision comprises Vaucher's natural genus *Oscillatoria*, and is the same with the section B. a. of my synopsis, but I have not used the word *sporangium*, because it cannot be properly applied to these joints, as will be hereafter shewn.

Of the second subdivision, which is entitled, "*Utriculis matricilibus*," Dr. Roth says, that this species of spurious partition differs from those formed by the *annular seed-cases* above described, in this particular, that they are not visible in the earliest, but only at some advanced stage of their growth, or in consequence of some violent concussion; and that the joints can never vary from the position allotted to them. Whilst the plants are young, or till their organization has been disturbed, the internal vesicles are contiguous to each other at their extremities, and the filaments then appear in every respect equal and continuous; but, when at length these vesicles become contracted, an empty pellucid space is left at each extremity, without any appearance of a true dissepiment in the middle. The kind of joint here described is found, according to Dr. Roth, in many of the *Ceramia*, as well as in *C. agagrophila*, *ericetorum*, and other *Confervæ* without any natural affinity; and it appears to me evident that the term *utriculus matricalis* cannot with propriety be used to define a species of joint which occurs so frequently in capsuliferous species.

The plants of the third section, "*Stricturis*," are destitute of real joints, but divided by annular strictures at uncertain distances from each other. *C. terulosa* is the only British species here arranged, unless my suspicion should prove well founded, that Dr. Roth's *C. reptans* is *Fucus opuntia*.

We next come to the third main division of the filamentous *Confervæ*, "*Articulate geniculis veris*." Such alone are admitted by Dr. Roth to be true dissepiments as actually intersect the interior of the tube, being formed by the branching of the parallel fibres, of which, together with a cellular membrane, the filament itself is composed. This section has four subdivisions, of which the first is the

“*Fasciata*.” In these Dr. Roth is of opinion that the dissepiment does not extend wholly across the tube, but leaves it pervious for its whole length. This subdivision comprises the genus *Conjugata* of Vaucher, with *Conferva equisetifolia*, *crispata*, *ebenea*, *vivipara*, *fucicola*, and many others, and it is therefore obviously far from natural.

Of the “*Torulosa*,” which form the second subdivision, the dissepiments rise above the surface of the tube in the form of annular excrescences. Dr. Roth here supposes the dissepiments to be interwoven with a large portion of the cellular membrane, which makes them less able to resist the elasticity of the enclosed air, and they thereby become distended. *C. fluviatilis* is the only British species that occurs in this subdivision, but my observations have tended to confirm the opinion of the late lamented Dr. Mohr, that these protuberances are of a different nature, and ought not to be regarded as dissepiments.

C. atra is arranged by itself, and forms a third subdivision with the name of “*Infusita*,” the meaning affixed by the Doctor to which term is, that the longitudinal fibres of the filaments on attaining to the length prescribed for each joint, suddenly unite in a single point, and are bent inwards towards the cavity of the tube, thus forming an appearance similar to that of the *tortulosa*, though in reality of different structure; and hence each joint is narrow at its origin, and gradually incrassated upwards.

The fourth and last subdivision is composed of the “*Verticillata*,” distinguished chiefly by their verticillated, or rather imbricated, ramuli. In this *C. verticillata*, and *spongiosa* are arranged, together with some foreign species probably of the same family, and with *C. villosa*, a plant widely different both in its nature and structure.

Having taken this cursory view of the genus *Conferva*, as established by Dr. Roth, it remains only to add, that enough has already been discovered of the fructification of many of the species classed under it, to shew the necessity of their removal to other genera, and it seems to me that those only should be retained which are propagated by seeds formed within the joints, without the

assistance of any external process whatsoever, thus excluding even the *Conjugata*, which it was his intention to admit.

MERTENSIA. — *Tubuli sub coriacei, intus articulati, sporula in tunica, papillas vesicales clavatas fasciculatas efficiente, sparsæ.*

This genus has but one species, the *Ulva lam'ricalis* of Linnæus, a native of the Cape of Good Hope, with which I am totally unacquainted. According to Dr. Roth's account, the structure of this plant is extremely curious. The filaments are lined on the inside with a fine cellular membrane, and at short, but equal and regular, distances a circle of spine-like processes issue internally, over which the cellular membrane is spread, so as to close up the tube transversely at every dissepiment.

HYDRODICTYON. — *Fila sub membranacea, tubulosa, ad angulos varios in utriculum retiformem finibus suis combinata, demum utriculum matri similem invaginatum producentia.*

C. reticulata differs so entirely from every other known *Conservæ*, that Dr. Roth has very properly formed it into a separate genus, with the present expressive name. The essential character in the second Fasciculus of his *Catalecta* is taken wholly from the singular contexture of its filaments, but this he has been enabled to amend in the third, by M. Vaucher's important discovery of its still more singular propagation.

ULVA. — *Membrana exansa, diaphana, fructificationum granulis præprimis circa marginem innatis.*

The genus, as here constituted, is intended to comprehend only those species which are composed of a single leaf-like membrane, the tubular ones having, as before mentioned, been removed to the *Conservæ*, and *U. incrassata*, *U. rubens*, and their affinities, to the following family.

RIVULARIA. — *Substantia gelatinofo-cartilaginea, hyalina, integumento membranaceo destituta; fructificationes in filis geniculatis intra substantiam nidulantibus.*

The plants which Dr. Roth has referred to this genus, are so closely allied

with the *Batrachosperma*, and the latter approach some other families of the *Conferve* by so many points, as to render the attempt to separate them extremely difficult. The gelatinous nature and appearance of the filaments is not sufficient, nor are the fine transparent processes into which their ramuli are drawn, for these may be also observed in *C. protensa*, *v. vivipara*, and some other *Conferve*. Although this affinity is so strong, yet as none of the *Rivularie* have ever been published under the latter name, I have not thought it necessary to notice them in my general synopsis.* Dr. Smith, misled by some apparent resemblance in their structure, has published some of the *Fuci*, and even *Tremellæ*, under this name, but I trust it will not be found necessary to retain them, or the *Rivularie* can no longer be regarded as a natural family.

LINCKIA.—*Substantia gelatinosa, hyalina, integumento membranaceo hyalino induta, furcata fructificationum granulis in lineas curvatas moniliformes ordinatis.*

Micheli used *Linckia* as a generic name for those *Tremellæ* with which he was acquainted, and in these he observed that the granules were arranged in regular lines. Dr. Roth, however, carrying his researches farther, discovered that in some only of the *Tremellæ* the seeds are thus arranged, but that in others they are scattered throughout the internal mucus without apparent order. He has therefore separated the former from *Tremella*, and with them constituted the present genus, retaining Micheli's original name. Five species have been ascertained, consisting of *Tremella n-floc* and *utriculata*; two recently discovered species, and *Ulva pruniformis*, which had been before removed to the *Tremellæ* by Mr. Woodward. The plant which Dr. Roth supposes to be *U. pruniformis* of Linnæus, is however essentially different from that figured in *English Botany* (t. 968,) with the same name, and which Mr. Hooker informs me is *Rivularia angulosa* of the *Catalæcta Botanica*. *Linckia pruniformis* is not known to be a British species.

* I have never seen a recent specimen, but I presume from the description, that *C. echinulata* v. Eng. Bot. t. 1278, belongs to this family.

TREMELLA.—*Substantia uniformis gelatinosa, hyalina, integumento membranaceo induta, fructificationum granulis in membrana contextu fibrosa absque ordine sparsis.*

Such of the plants as have been usually called *Tremellæ*, and have the seeds scattered without order throughout the internal mucus, constitute, as is above observed, this genus.

BYSSUS.—In the third volume of the *Flora Germanica*, this genus is retained with the following definition, “*Filamenta vel fibræ tenuia, membranacea, lanuginosa, extus fructificatione granulis adspersa,*” and comprises all the species of Hudson’s section, “*filamentosa,*” but in the second volume of the *Cataleeta Botanica*, some of them had been referred to the *Fungi*, and the “*Pulverulentæ*” had been several years before removed to the *Lichens* in the first volume of the *Flora*. In the third Fasciculus of the *Cataleeta*, the genus *Byssus* is not noticed, but three of the filamentous species are incorporated with the *Conferve*. I have examined *B. phosphorea, æruginosa, velutina, purpurea, nigra, aurea*, and *sulphurea*.* and cannot find that they possess any character to distinguish them from the *Conferve*, but *B. septica* seems to be of a different nature, and to belong to the *Fungi*, with which it has been arranged by M. Perfoon.

It seemed necessary to state my reasons for not having followed the arrangement of so eminent a Botanist as Dr. Roth, and I have consequently been obliged to point out what have appeared to me to be its leading imperfections. Every word written by such an observer must, however, be of value, and although his arrangement has, in my opinion, been premature, I am convinced that a better will never be effected without a liberal use of his numerous observations.

* *Byssus sulphurea, Lichenis facie, tenuissima ac densissima, filtrum & pannum laneum textura similans.* MICHEL, p. 211 a 17. DILL. *Hist. Musc.* p. 7. t. 1. f. 13. This singular species has not been discovered in Britain, and I am indebted to Mr. Dryander for a specimen from the Bankian Herbarium.

SECTION III.

SYSTEM OF VAUCHER.

M. VAUCHER has divided the Confervæ into the six following genera. *Ectosperma*, *Conjugata*, *Hydrodictyon*, *Polyspermum*, *Batrachium*, and *Protilifera*. In pursuance of my plan, I shall now give an outline of his ideas of the general fructification of each of these, with which I shall incorporate the few observations I have myself made on the fruit of their respective species.

The ECTOSPERMES are thus defined, “*Les organes fécondans sont extérieurs, et les grains sont portés sur des pedoncles qui partent d’une tige ramifiée.*”

The generic name *Ectosperma*, has been changed by M. Decandolle to *Vaucheria*, and the genus is with this alteration adopted in *English Botany* with the following essential character, “*Antheræ, awl-shaped, incurved. Capsules adjoining to the Antheræ, ovate, single seeded, in pairs or solitary.*”

M. Vaucher has traced the growth of these plants, through all their stages, and satisfactorily proved what the observations of Mr. Borrer have since fully confirmed, that they are propagated by the germination of their granules. Although, in his specific descriptions, M. Vaucher has called these granules naked seeds, yet his remarks, added to my own, induce me rather to believe that the *grains* of all the *Vaucheria* are monospermous capsules, as Dr. Smith has described them. I wish, however, rather to submit this as a matter for future observation, than to express a decided opinion upon the subject, though having circulated a theory founded on a contrary opinion among my Botanical friends, I think it necessary to shew how I was led into this error. The species figured at T. 74, under Muller’s name of *C. vesicata*, is *Vaucheria fessilis*, but I could not then discover any antheræ, and as Vaucher’s *grains* are represented to be naked seeds, and as he had not mentioned the capsules or bladder-like vesicles which abounded in my specimens, I concluded that it must be a different species.

I afterwards discovered the grains and antheræ of *V. geminata* on some filaments, precisely resembling those of *Conferva vesicata*, but the grains were so much smaller, that, relying on M. Vaucher's description, I concluded they were naked seeds. I therefore imagined that in the former specimen the male and female organs were concealed within the capsule, and in the specimens which I afterwards gathered, that the capsules had fallen off or died away, and thus left the seeds sitting on their receptacle with the anthera exposed to view.

M. Vaucher has not been able to prove the nature of what he has called *anthera* with equal satisfaction to himself; "Cependant je ne suis pas aussi certain des fonctions auxquelles est appelée la corne qui les accompagne; elle est à la vérité constamment placée dans les voisinage des grains; on la voit bien repandre sa poussière dans l'*Ectosperme ovicide* en particulier, cela est incontestable. Cependant j'ai toujours désiré quelque expérience directe, qui me put convaincre de l'usage de cette corne." It appears from this quotation that M. Vaucher has been rather too hasty in his application of the term *anthera* in the specific descriptions, and that he has fallen into the common error of supposing that the analogy between phænogamous and aquatic cryptogamous plants must be perfect, without making a proper allowance for the difference that must necessarily exist in the latter from the difference of their situation. If his conjecture should be confirmed by future observation, I am of opinion that the awl-shaped processes subtended by the capsules of several *Ceramia*, and the tribe intended to have been called *Borreria*, will also prove to be male organs, and effect the fecundation of the seed in the same manner.

Of this genus, M. Vaucher has enumerated eleven species, few of which can be at all distinguished from each other except by the fructification, and this varies so much with respect to the size, number, and disposition of the capsules in almost every different mass, and even in the same specimen, that it can hardly be considered a sufficient indication of specific difference. My friend, Mr. Hooker, says he has seen petioles bearing two and some three capsules, and other capsules single and sessile on the same plant. In my description of *C.*

vesicata, (*V. f. filis*) I have remarked its close affinity with *C. amphibia*, and in the third Fasciculus of the *Catalecta Botanica*, Dr. Roth has arranged all the *Vaucheriae* as mere varieties of this species. My observations have made me incline to this opinion with respect to a majority of the species, and I much doubt whether they may not be all referred to either *C. amphibia*, *dichotoma*, or *Dillwynii*. As *C. myochrous* and *C. comoides*, in their structure, approach these species, it is possible that their fructification, when discovered, will prove similar. Should this conjecture be well founded, the unjointed species form a family, sufficiently distinct from the other Confervæ; and whenever the algæ are new modelled, will, I trust, be continued with the generic name by which M. Decandolle has so properly distinguished the *Ectospermes*.

M. Vaucher has made but few references to the works of preceding authors, and, to prevent confusion, it must be remarked that these few are extremely inaccurate: thus all the *Ectospermes* are said to have been comprised by Linnæus under the name of *C. fontinalis*, with which plant none of them have the least affinity. Muller's *C. vesicata* is referred to *Prolifera vesicata*, which is a widely different species, and the reference to *C. velutina* with the synonyma of Micheli and Dillenius is equally erroneous.

CONJUGATA.—*Les grains sont intérieurs et renfermés une à une dans des tubes cloisonnées et toujours simples.*

This natural and wonderful family is better characterized by the name, than by this generic description, under which many other plants might be arranged whose filaments have never been observed to conjugate.

Muller, although he published excellent drawings both of *C. nitida* and *jugalis*, entertained no idea that the difference between them merely arises from the fructification. Messrs. Charles and Romain Coquebert, who also discovered *nitida* in its conjugated state, were equally ignorant of this circumstance, though they advanced one step further, and ascertained that the globules formed by the union are true seeds which reproduce the species. M. Vaucher's interesting memoir, published by the Philomatic Society of Paris, although full of im-

portant discoveries on other *Confervæ*, merely confirms the foregoing observations, and contains but little new on the *Conjugatæ*.

In the spring of 1802 I discovered, that at a certain period of their growth, small tubes are protruded from the simple filaments of *C. nitida*; that these unite with the similar tubes of other contiguous filaments; that the grains of the one being emptied into, coalesce with the grains of the other filament, and thus constitute the *C. jugalis* of the *Flora Danica*.* I also found that this strange property is not confined to this single species, but that the *C. geniflexa* of Roth is formed in like manner by an union among the simple filaments of Muller's *C. serpentina*, and I traced those of *C. spiralis* from a simple to a conjugated state. In the summer of the same year, Mr. Woods found *C. bifurcata* with the filaments conjugated, and the supposed originality of these discoveries afforded me great pleasure, being then quite ignorant of M. Vaucher's continued application to this tribe. At length the appearance of his *Histoire des Conferves d'eau douce*, at Geneva, in 1803, shewed that we had arrived at a knowledge of the *Conjugatæ*, and formed nearly the same conclusions respecting them, almost at the same time, and quite independently of each other.

I have since discovered the seeds of *C. geniflexa*; they are large and globular, and not formed within either filament, as in *C. jugalis*, but in the connecting tube, which thereby becomes greatly distended, as is represented in my supplementary plate. M. Vaucher could not discover the seeds of this species, and of the nature of his observations recorded in the following passage, I cannot form any conjecture. “Depuis le moment où j'écrivais cette description, j'ai vu germer cette conjugée; elle naît d'une manière fort différente de toutes les autres: la matière ne passe pas d'un tube à un tube voisin, mais chaque loge fournit elle même une jeune plante; le tube extérieur qui se trouve renfermé,

* When I first made the drawings and descriptions of *C. nitida* and *jugalis*, I had not the least idea that they belonged to the same species, and it was unfortunately not till just after my first fasciculus had been given to the printer, that I was fully satisfied on this subject. My description of *C. spiralis*, and the drawing B which was afterwards added, will, however, sufficiently prove that I had even then arrived at a knowledge of this curious property.

devient une jeune Conjuguée, qui étoit toute entière contenue dans le vieux tube, comme elle même contient les plantes qui doivent se développer ensuite : elle en sort par l'extrémité lorsqu'elle occupe la dernière loge, ou par les côtés lorsqu'elle se trouve dans une des loges du milieu." I have sometimes seen the simple filaments of *C. genuflexa* rolled round in a serpentine form, as Muller has represented, and these have been erroneously referred by M. Vaucher to a separate species.

Each joint of the *Conjugatae* puts forth only one connecting tube, which is sometimes on one side of the filament and sometimes on the other ; so that each filament is often connected with two others. A short time after the union has been effected, the granules from one joint, gradually pass into that with which it is joined, till the former at length becomes empty and colorless. The granules of both then coalesce in the other joint, or in the connecting tube, and form a globular or oblong mass, which M. Vaucher has proved to be the true seed, and has seen it germinate and reproduce the species. No seeds appear to be ever formed but by this union of the joints of two different filaments with each other, and of these united joints only one ever produces a seed. It is therefore natural to conclude, although the contents of the joints by their appearance cannot in the least be distinguished from each other, and although in things so minute and obscure it is necessary to speak with the utmost diffidence, that one contains male and the other female powers, and that their union is essential to the propagation of the *Conjugatae*. It might indeed reasonably have been supposed that of two conjugated filaments, the whole of the one is male and the other female, but in opposition to this it generally happens that a part of the joints give out, and a part receive granules in the same filament. I have seen three filaments connected together, and the connecting tubes of the middle one have sometimes been thrown out by the joints on one side, and sometimes on the other, and the seeds have been formed in either filament, without apparent order. Each filament must therefore be considered hermaphrodite, possessing in its different joints both male and female powers, which, as in the

snail, can only be rendered productive by contact with the opposite powers of other filaments. Thus this apparently insignificant tribe affords an unique and wonderful analogy between the reproduction of the animal and vegetable kingdoms, and is a striking evidence that "the power of God is over all his works, and is seen to the astonishment of man in the variety of his wonders."

HYDRODICTYUM. — *Chaque articulation devient elle même une nouvelle plante qui s'étend comme un réseau.*

C. reticulata was first separated from the *Conferve* under the generic name of *Hydrodictyon* by Dr. Roth, as is already mentioned, and no other plant has been since discovered with which it can be associated. Its surprising mode of propagation is mentioned in my description of this species, and I shall therefore only repeat that we are wholly indebted to the scrutinizing talents of M. Vaucher for this important discovery.

POLYSPERMA.—*Les grains sont répandues en très grand nombre dans l'intérieur d'un tube renflé, non transparent et ramifié.*

C. fluviatilis and *glomerata* are the only species which M. Vaucher has been able to refer to the present genus, to which however he suspects that several others also belong. He observed that the filaments of *C. fluviatilis* are lined with minute beaded threads, which at length divide, and each bead then becomes a separate granule. He thinks it probable that a part of these grains, although they cannot be distinguished from the others, are male organs which die away as soon as they have performed their office; a conjecture that seems rather ingenious than probable. He however ascertained, by a course of well directed experiments, that at least a part of these granules are true seeds, and traced their growth from the germination till they resembled the parent plant in all respects. These globules, both in their connected and detached state, may be readily observed by cutting and pressing the filaments, and, though I have failed in my endeavours to witness their germination, I cannot in the least doubt the accuracy of M. Vaucher's observations, or suppose that this species is not propagated as he describes. Tufts of young seedlings may be also fre-

quently observed, as he describes them, issuing from the older filaments: these he attributes to the germination of seeds which have insinuated themselves from the interior to the substance of the frond, and thus grow parasitically on their parent. M. Vaucher does not seem to have noticed the minute hair-like processes that issue externally from the protuberances, between which and the beaded threads on the inside, I have not been able to discover any connection. Upon the subject of these discoveries as to the structure and fructification of the *Polyperma*, though I have here quoted M. Vaucher alone, having myself had an opportunity of consulting no work but his, yet I feel it incumbent upon me to say, that the concurring testimony of German Botanists attributes the original detection of them to the late Dr. Mohr, who appears from what is said by Dr. Roth, to have given an ample account of them in a number of Schrader's Journal for 1801, of which I am not aware that there is a copy at present in England.

C. fluviatilis differs widely in habit and appearance from other British Confervæ, agreeing in its real character probably with none but *C. torulosa*, unless indeed the conjecture of my friend, Mr. Turner, be well founded, that *Fucus pedunculatus*, *F. aculeatus*, *C. verrucosa**, and *C. villosa* may belong to the same tribe. With respect to *C. glomerata*, which has not the least affinity to any of these, M. Vaucher says little more than that he found its joints contain numerous minute granules, and thence concluded they were seeds. Of this, although he continued his observations with unremitted assiduity for two years, he could, however, obtain no further proof, than that the stones in a river were covered with somewhat similar granules, which germinated and produced this species. He therefore determined on the arrangement of *C. glomerata* in this genus, but candidly allows, ‘C'est bien plus l'analogie et le raisonnement que les observations directes, qui nous ont conduit dans les conjectures que nous avons hasardées sur son Histoire.’

* I have omitted this species in my synopsis, because having carefully examined its internal structure, I am decidedly of opinion that it has no claim whatever to a place among the Confervæ. It will, I hope, appear in Mr. Turner's Historia Fucorum.

BATRACHOSPERMUM.—“ Chaque Anneau, après s'être séparé de l'ancienne Conserve, pousse de toutes parts des nouvelles ramifications.”

In this genus, *Conserva gelatinosa* and *mutabilis*, together with the *Conserva chara*, and *Rivularia elegans* of Roth, and *Ulva incrassata* of Hudson, are arranged by M. Vaucher, who is of opinion, “ Que cette famille fort différente des autres se multiplie par ses anneaux. Lorsqu'elle a acquis à peu près tout son accroissement, les anneaux dont elle est composée, se rompent et se séparent. Le plus grand nombre d'entr'eux, sur tout lorsque toutes les parties de la Conserve se détruisent en même temps, s'éloignent de manière qu'il n'est plus possible de les suivre. Les autres restent attachés aux filets à cause de leur viscosité; peu à peu ils croissent et s'étendent. La forme qu'ils ont alors n'est pas régulière, mais elle est assez semblable dans tous les grains. Insensiblement ils grossissent; en même temps ils acquièrent assez de transparence pour qu'on puisse voir dans leur intérieur la Batrachosperme à laquelle ils doivent donner naissance; enfin l'enveloppe, qui les contenait, ne pouvant plus se prêter à leur accroissement il en sort de toutes parts un grand nombre de petites plantes, qui s'étendent en rayonnant autour d'un même point, et chaque filet est un tronc principal de la Conserve que se développe. Cet état de demi développement est celui des grains noirs que l'on aperçoit sur la Batrachosperme à collier (*Conserva gelatinosa*.) Ils y sont retenus, comme je l'ai dit, par des filets de la plante; et si on les examine au microscope, on trouve à leur centre l'anneau dont il est ici question, qui pousse de toutes parts des filets rayonnans et déjà articulés.”

M. Vaucher, as well as Dr. Roth, has conjectured, that the delicate capillary threads, which are seen issuing from the extremities of the ramuli of these plants, and constitute one of its most obvious characters, may be spermatick vessels, but the only circumstance which materially favors this idea is, that they fall off when the plant has attained to a certain age.

I have not been able to discover the fructification of any of the species arranged in this genus, except *C. gelatinosa*. Of this I have given a drawing, and it appears to consist of an aggregation of seeds, resembling a compound berry,

which I have seen germinate, both whilst attached to and when separated from the parent plant. I am sorry to differ so materially from M. Vaucher on this subject, and I apprehend it would not have been the case if he had used a higher magnifying power.

Whether M. Vaucher has done right in uniting the *Rivularia* with *Batrachospermum*, further observations are in my opinion still wanting to decide. I confess myself inclined to believe that the fructification of these genera will be found to be different, but my friends, Mr. Turner and Mr. Hooker, whose united opinions must have far greater weight, agree with M. Vaucher that they should be joined.

PROLIFERA.—*Il sort des parties renflées ou des Bourrelets du vieux tube, des filets cylindriques qui s'étendent en tout sens, et qui après avoir pris un assez grand accroissement, se séparent ensuite de leur Mère, pour devenir eux mêmes une Conserve parfaite.*

The following extract will serve more fully to shew M. Vaucher's idea of the manner in which these *Conservæ* are propagated. “Lorsque les prolifères sont prêtes à se reproduire, on voit naître, le long des tubes des renflemens cylindriques, que l'on prendroit pour des nœuds, si la plante n'étoit pas d'ailleurs cloisonnée. Ces Bourrelets d'abord peu sensibles, grossissent bientôt, ensuite ils se couvrent d'une matière pulvérulente qui est formée ou des debris qui flottaient dans le liquide, et qui ont été retenus par le Bourrelet; ou d'une matière qui s'est sécrété de la Conserve. Lorsque cette poussière a séjourné quelque temps sur le Bourrelet, on voit sortir ses nombreux filets qui forment d'abord de petites têtes arrondies. Malheureusement cette poussière en même temps qu'elle semble favoriser l'accroissement, gêne beaucoup l'observateur. On ne peut guères voir le premier développement de la jeune plante, et juger par exemple, si elle sort de la surface du Bourrelet ou du centre. Quoi qu'il en soit, les jeunes filets s'étendent rapidement sur toute la circonférence du Bourrelet où ils forment comme une houppe de poils. Peu à peu leur cloisons commencent à se marquer, bientôt leurs tubes ressemblent en petit à celui de la

grande prolifère; enfin ils se séparent pour aller former ailleurs un nouvel individu semblable à celui sur lequel ils ont pris naissance; *mais j'avoue que je n'ai pas vu de séparation*, quoique je n'aie aucun lieu de douter qu'elle ne s'opère."

I have now before me the variety mentioned in my description of *C. rivularis**, and more fully described in my synopsis, with short spine-like processes, resembling both in size and shape those figured on Vaucher's† *P. crispata*. If, as M. Vaucher imagines, these are a proliferous progeny, it must be supposed that they would resemble the parent, not only in their joints, but also in the shape of the filaments; the latter are, however, cylindrical throughout, and the former, at least in some species, are represented as remarkably acuminate; and of the processes of *C. rivularis* at this time under my observation, many, not the tenth of an inch in length, are as pointed as possible, although the diameter at their base equals that of the main filament. I examined this variety during a fortnight, but could not observe that the ramuli at all increased in length, or suffered any change, till at the end of that period, the whole died away, and disappeared together. M. Vaucher has not noticed how far their length bears any regular proportion to that of the main filament, and he admits, contrary to his generic definition, that he has never seen them separate from it. In the description of *P. floccosa*, which is probably the same with my *C. punctalis*, he says, "Elle se multiplie avec une telle rapidité qu'elle couvre au bout de quelques jours des places considérables dans lesquelles on ne l'avoit pas d'abord aperçue," and yet he could never discover any proliferous tendency, or any other means whatever by which this increase was effected. I therefore wonder at this species having been arranged with the *Prolifera*, but M. Vaucher possesses the rare merit of never concealing or distorting truth to serve a favorite theory, and expresses himself throughout so doubtfully of the use and nature of the branch-like processes, that it is rather surprising he should have founded the genus with such an uncertain character. It is nevertheless probable, from M.

* *Prolifera rivularis* of Vaucher differs from this species in its much longer joints.

† See the drawing of this species in my supplementary plate B.

Vaucher's description, that the processes which he observed on some species are of a different nature from those resembling thorns above mentioned. It seems to me that the fructification of the *Proliferae* consists in their internal granules, and, equally with those of *C. fluviatilis*, it is reasonable to suppose, that these seeds may in some instances become lodged, and germinate in the substance of the filament, which germination would necessarily occasion the frond in that part to swell, and thus produce the *Bourrelets*, which M. Vaucher describes. It does not, however, appear that the filaments thus generated ever arrive at maturity, and I am decidedly of opinion that this is not the mode designed by nature for the propagation of these *Confervæ*.

OSCILLATORIA.—This is the name given in M. Vaucher's History of the *Tremellæ*, to the *Confervæ* of Dr. Roth's section '*Sporangiorum annulis*,' which are here arranged so as to constitute a separate genus.

M. Vaucher observed that *C. fontinalis*, and those of its congeners which float on the surface of water, are generally attended by "une espece de feutre" "douce et onctueuse au toucher," which he supposes is of the same nature as the internal mucus of the *Tremellæ*, and he compares the filaments themselves to the beaded granules of the *Linckia*. I have never seen this felt-like substance except with *C. fontinalis*, and have always considered it as decayed vegetable or other extraneous matter, in which the plant likes to grow, nor can I find that it bears the least resemblance to the internal mucus of a *Tremella*. At all events it is not sufficiently general to warrant the removal of the genus; for M. Vaucher admits that it is not met with in any of the species which grow on stones, or on other substances, and these, I believe, constitute a majority of the genus. The supposed spontaneous motion of the filaments first noticed by M. Adanson, and mentioned in my description of *C. limosa*, however, seems principally to have induced him to remove the *Oscillatoria* from the *Confervæ* to the animal kingdom, for to this he supposes that the *Tremellæ* belong. During the last eight years I have frequently examined several species in hopes of discovering this mark of animality, but must confess I could never observe any motion

that might not be attributed to their wonderfully rapid growth, which must occasion such thickly entangled filaments to press against each other; to the water in which they are examined, the slightest motion of which is sufficient to agitate them, or to the numerous animalculæ with which they are constantly infested.

It would exceed the limits of my present undertaking to give a detail of M. Vaucher's numerous conjectures, and curious remarks, and I shall therefore now confine myself to the relation of what I have myself observed concerning this family.

The *Oscillatoria* constitute a natural genus, and are distinguishable at first sight by their numerous filaments so thickly matted together as to form a jelly-like mass. The filaments, when examined with the higher powers of a microscope, appear to me equally obtuse at both ends, and are regularly divided by remarkably delicate dissepiments into extremely short joints. Some of the dissepiments may be observed of a darker color and thicker substance than the others, and at these I believe the filaments divide into separate fragments, each of which, as M. Adanson first observed, "Devient absolument semblable à celui dont il s'étoit séparée, et capable d'en produire à son tour de nouveau." In *C. vaginata*, however, the filaments are multiplied by a longitudinal instead of a transverse division, as appears in my description of that species. The diameter of the filaments of this family, never varies according to their age, as in other Convolvæ, but is constantly the same in every species, and hence M. Vaucher has been led to suppose that they are always propagated by the viviparous division only, and never by seed. This opinion I was for some time inclined to adopt, till it was shaken by an appearance of capsules on some specimens of *C. decorticans*, which is represented in my supplementary plate. They are so unusually large in proportion to the thickness of the filament, that at first sight I thought they were of the same nature with galls, or those excrescences that are so frequently inhabited by the *Cyclops* on the *Vaucheria*, but, when I applied the highest powers of my microscope, I found their shape too regular and well

defined, and themselves surrounded by a pellucid limbus so entirely resembling that of many of the *Ceramia*, as to give them every appearance of true capsules. I kept the specimens several days, but could not observe any seeds escape from them, nor have I since been able to discover any thing at all similar in either this or any other species of *Oscillatoria*, and subsequent discoveries have increased my suspicions that they were not capsules, and have induced me to believe that *C. decorticans*, as well as the other species of this family, are propagated by seed in a different manner.

In examining some specimens of *C. difformis*, I observed a number of detached globules of the same color, and of about equal diameter with that of the filaments, and I also observed that in some filaments which were partly empty, the remaining joints had assumed a similar globular shape. Some of the detached globules had become of an oblong form, and a dissepiment was then observable in the middle, while others were more elongated with four joints, and others were still longer, so as to form a regular series, beginning with the globule, and ending in a perfect filament. I have, therefore, no doubt, so far as it is possible to state any opinion on objects so minute and obscure without any doubt, that each joint at length becomes a seed, which escapes at the apex of the filament, and that by its evolution the species is propagated. I have observed a precisely similar appearance in *C. mirabilis*, and have also seen detached granules, apparently of the same nature among the filaments of *C. fontinalis* and *C. muralis*, and in both these species, those filaments which are partly empty have their remaining joints of a more globular form, than they are in those which continue perfect.

I have ascertained that the filaments of *C. difformis* conjugate in a singular manner, (which, together with the fructification, is represented in my supplementary plate A) and that the supposed ramifications of this species are thus constituted. *C. difformis* is therefore most closely allied with *C. mirabilis* and *C. majuscula*, and I incline to the opinion that here, as well as in the *Conjugatae*, an union of their filaments is in some manner essential to their fructification.

The *Oscillatoria*, besides their general accordance in structure, are connected in different points by *C. diffiliens* and *confervicola* with the other *Confervæ*, nor can I, with all due deference to the opinion of M. Vaucher, allow myself to doubt that the propriety of retaining them among the submersed Algæ in the vegetable kingdom will be admitted by almost every Naturalist, and especially by those who make this department of Botany their study.

To conclude, although I cannot give implicit assent to all M. Vaucher's observations and deductions, yet the greater part of his physiological discoveries are so well established and so important, that they form a memorable epoch in the history of the submersed Algæ. He has the credit of having first raised a *Conferva* from feed, and of having traced it through the different stages of its growth, and, to mention one only of his many discoveries, that of the wonderful propagation of *C. reticulata*, is in itself sufficient to render his name respectable, as long as scientific merit continues to be held in esteem.

SECTION IV.

SYSTEM OF DECANDOLLE.

I now turn to Decandolle, whose arrangement of the submersed Algæ in the *Flore Francoise*, and *Flora Gallica*, is however hardly worth notice. It is principally formed by incorporating the two foregoing systems, with much alteration but little or no improvement in their genera, as will be sufficiently shewn by the following outline of his arrangement.

NOSTOC.—*Integumentum virescens membranaceum intus farctum gelatina mucosa filamentis moniliformibus intertexta.*

In M. Vaucher's system, *Tremella* constitutes an order which is referred to the animal kingdom, and comprises the two genera of *Oscillatoria* and *Nostoc*.

The latter contains the plants usually called *Tremella*, which M. Decandolle, under Vaucher's generic name, has here restored to their place in the vegetable kingdom.

RIVULARIA.—*Membranæ subcartilagineæ, lobatæ aut ramosæ, mucosæ gelatinosæ obtectæ.*

This however is not Dr. Roth's genus, but rather the same with *Ulva* of Vaucher, and contains, 1st. his *U. gelatinosa*, under the name of *R. tubulosa*. 2d. *Ulva lubrica* of Roth. 3d. *R. fætida*, which is probably my *C. fætida*, and 4th, a new species, with the name of *R. Halleri*.

ULVA.—*Frondes membranaceæ. Semina sub epidermide latitantia, sæpius aggregatæ, frondis ipsius destructione exeuntia.*

This genus in addition to most of the *Ulva*, comprises all the *Ulva*-like *Fuci*, with *F. digitatus*, *F. bulbosus*, *F. tomentosus*, &c.

FUCUS.—*Alga marinæ membranaceæ aut filamentosæ. Capsulæ aut semina aggregata in tuberculos nunc laterales, nunc terminales, apice poro debiscentes.*

The genus as here constituted comprises a part only of the plants usually called by the name of *Fucus*, some having, as is above mentioned, been removed to the *Ulva*, and *F. pinastroides* and *F. filum* to the following family. *Ulva plumosa*, which Dr. Roth has carried to his genus *Conferva*, is here, and with equal impropriety, described under the name of *Fucus arbuscula*.

CERAMIMUM.—*Stipes filamentosæ marinæ simplices aut ramosæ, dissepimentis transversalibus nodoso-articulatæ; tubercula polysperma sub globosa lateralia aut terminalia.*

The species of Dr. Roth's second division of *Ceramium*, '*filis spurie geniculatis*' constitute this genus, and those of the first division are sent back to the *Fuci*.

DIATOMA.—*Plantæ pseudo-parasiticæ oculo nudo vix conspicuæ, filamentis simplicibus articulatis, articulis in adulta planta transversim sectis.*

The species arranged in the section "*articulis solutis*" of my synopsis, consti-



tute a natural family, and may be all referred to this genus, in which however only Roth's *C. mucor* and *C. foeculosa* are here enumerated.

CHANTRANSIA.—*Filamenta ramose, dissipimentis instructa; semina minutissima, intra filamenta recondita, in quoque articulo numerosa.*

This genus is named by M. Decandolle in honor of M. Girod Chantrons. With one of the eight species here enumerated I am entirely unacquainted, and the remaining seven may be referred to at least three different natural families. 1st. *C. terulosa* and *C. fluvialis* belong to Vaucher's *Poly sperma*, with which *C. glomerata* also here retained certainly possesses no affinity. 2d. *C. atra*, which in my opinion is undoubtedly a *Batrachospermum*. And 3d. *C. rivularis*, *C. cistifera*, and *C. vesicata* of Vaucher, which belong to his family of *Prolifera*.

CONFERRA.—*Filamenta simplicia, dissipimentis instructa, interdum epe tubuli inter se conjuncta, materia vividi, nunc spiruliter, nunc bifidatim, nunc sparsim disposita intra loculos facta. Semina in quoque loculo solitaria.*

The genus as here constituted is the same with *Conjugata* of Vaucher, and contains all the species arranged as such in the *Historie des Conferves d'eau douce*. *Prolifera parasitica* and *P. floccosa* of the same author, are also added under a separate section, entitled, "*Haud planè nota.*"

BATRACHOSPERMUM.—*Filamenta muco gelatinoso obiecta, ramosa, ramis filo hyalino plus minusve elongato terminatis; annulis ovatis, solidis, ad extremum progrediendo decrepescentibus. Corpusculis birtis (plantularum rudimentis) inter ramos sparsis..*

This genus is the same with Vaucher's *Batrachospermum*, and is intended to comprehend the whole of the *Rivulariæ*, as well as the *Batrachosperma* of Roth.

HYDRODYCTION.—*Habitus saccatus, fere clausus, retiformis, interstiliis, seu areolis polygonis.*

C. reticulata, as in the systems of Roth and Vaucher, is here placed by itself.

VAUCHERIA.—*Filamenta herbacea dissipimentis planè destituta. Semina externa, primo tubo adfixa, tandem caduca.*

This, as I have before remarked, is the same with Vaucher's genus *Ectosperma*.

SECTION V.

CONFERVÆ OF HUDSON.

HAVING, through the kindness of Dr. Williams, had repeated access to the Dillenian Herbarium, and received some valuable information respecting the synonymy of the Flora Anglica from Sir Thomas Frankland and the Rev. Hugh Davies, who were both intimately acquainted with its distinguished author, I feel happy in being able to remove the uncertainty that has hitherto attended the elucidation of many of Hudson's Confervæ. I shall therefore offer a few observations on each of the doubtful species, and refer the remainder to the corresponding figures of the present work.

1. *C. rivularis*. T. 39. Var. β . is *C. nitida* T. 4.

2. *C. fontinalis*. T. 64.

3. *C. violacea*. A plant which exactly agrees with Dillenius's and Lightfoot's descriptions, and also with some of the specimens in the Dillenian Herbarium, grows abundantly on the stones in some rapid rivulets in the neighbourhood of Swansea, and seems to be only a slight variety of *C. decorticans*. Mr. Dickson gave me a specimen of *C. difformis*, gathered in the Highlands, under the name of *C. violacea*; but, although the former, especially when dried, is of a striking violet color, yet it differs entirely from the latter in its mode of growth, as described by Dillenius.

4. *C. furcata*. The late Mr. Pitchford gave me an authentic specimen, marked by Hudson "*C. furcata*," which is nothing but a narrow variety of *C. dichotoma*. I have little doubt that Dillenius's No. 10, which Hudson calls *furcata* β , is a variety of *C. amphibia*:—*C. amphibia* and *C. dichotoma* are, however, very closely allied.

5. *C. dichotoma*. T. 15.

6. *C. bullifera*. I think there can be no doubt that many of the species whose

filaments grow sufficiently entangled to retain air bubbles, and are thereby floated on the surface of the water, were confounded together, and constitute the present supposed species.

7. *C. canalicularis* seems to me certainly nothing more than one of the numerous varieties of *C. amphibia*, which grows about mills and other falls of water, exactly as Dillenius has described it. This opinion is confirmed by Mr. Turner's *Observations on the Dillenian Herbarium*, published in the *Transactions of the Linnæan Society*.

8. *C. amphibia*. T. 41.

9. *C. rigida*. My own observations at Oxford confirm Mr. Turner's opinion, that this is nothing but *C. glomerata* encrusted with some extraneous matter.

10. *C. fasciculacea*. This is a *Fucus*, as appears both by the Dillenian Herbarium, and by a specimen which Mr. Davies received from Hudfon. By calling it a *Fucus* I do not mean to express any opinion upon its fructification, which is at present unknown, but merely to say that it is quite destitute of joints.

11. *C. littoralis*. T. 31.

12. *C. tomentosa*. T. 32.

13. *C. albida*. This plant, which has long been wholly unknown to Botanists, appears from a very careful examination of the Dillenian specimen, by Mr. Hooker, Mr. Turner, and myself, under the microscope, to be really a distinct species, and is so described in my synopsis, and figured in the supplementary plate E. Mr. H. Davies has obligingly favored me with a plant which had been so named by Hudfon, and which is the *C. Hookeri* of this work.

14. *C. æruginosa* is described in my synopsis from the Dillenian specimen, of which a fragment is also represented in the supplementary plate E.

15. *C. nigra*. Authentic specimens in the Herbaria of Sir Thomas Frankland; and the Rev. H. Davies, prove that my *C. atro-rubescens* is this species.

16. *C. scoparia*. T. 52.

17. *C. cancellata* is *Sertularia spinosa*.

18. *C. multifida*. This, as well as *C. imbricata*, on the authority of an authentic specimen sent by the Bishop of Carlisle to Mr. Turner, appears clearly to belong to the *C. equisetifolia* of this work, T. 54; I have, however, retained the name of *C. multifida* to the plant so called in *English Botany*, as the name, though then erroneously applied, is really applicable to the plant, and, not being attached to any other, may fairly be left to it.

19. *C. spongiosa*. T. 42.

20. *C. reticulata*. T. 97.

21. *C. fluviatilis*. T. 29.

22. *C. atra*. T. 11.

23. *C. gelatinosa*. T. 32.

24. *C. capillaris*. T. 9.

25. *C. corallina*. T. 98.

26. *C. fetacea*. T. 82.

27. *C. elongata*. T. 33.

28. *C. ciliata*. T. 53.

29. *C. polymorpha*. T. 44.

30. *C. tubulosa*. The specimen according with Hudson's reference, in the Dillenian Herbarium, seems, as Mr. Turner remarked, to be only an unusually thick variety of *C. rubra*, and I have myself gathered nearly similar appearances of this ever varying species.

31. *C. rubra*. T. 34.

32. *C. purpurascens*. The specimen No. 41 in the Dillenian Herbarium, does not appear to me to be distinct from *C. rosea*, and I have little doubt that this is the species here described by Hudson. It however seems better, especially as the matter is in some degree questionable, that it should be continued with the name of *C. rosea*, by which it is now universally known.

33. *C. nodulosa*. On the authority of Mr. Turner is *C. diaphana*. T. 38.

34. *C. pellucida*. T. 90.

35. *C. vagabunda*. There can, I apprehend, be no doubt, from Dillenius'

description, specimen, and figure, that *C. fracta*, T. 14, is the species here intended.

36. *C. rupestris*. T. 23. The specimen No. 28 of the Dillenian Herbarium, to which Hudson refers as his variety β of this species, is much injured, but I have little doubt that it is *C. diffusa*. T. 21.

37. *C. fericea*. In the Dillenian Herbarium there are two specimens under the name of *C. marina trichoides virgata fericea*, of which one is marked "ex aquis dulcoribus," the other "e maritimis;" and of these the former is a trifling variety of *C. glomerata*. I have never seen *C. glomerata* with a similar appearance to that of the latter, or having the branches so much elongated, but from the look of the joints, disposition of the ramuli, and place in which it was gathered, it may probably be Dr. Roth's variety β . *marina* of that species. According to the *Flora Anglica*, *C. fericea* grows "in rupibus et faxis sub-marinis;" and I cannot help suspecting that Hudson confounded *C. late vireus* with other plants under this name, but neither that species, nor either of Dillenius's specimens have the least affinity with *C. littoralis*, to which in the *Historia Muscorum* it is said to be closely allied, and I therefore doubt whether *C. fericea* can be regarded as a single species.

38. *C. glomerata*. T. 13.

39. *C. fulva*. I suspect that *C. repens*, T. 18, is the plant here designed, but proof is wanting.

40. *C. nigrescens*. Following the generally received opinion among Botanists, I have in my synopsis agreed with Dr. Smith in retaining the appellation of *C. nigrescens* to the plant so called in *English Botany*, though, in so doing, I have acted in opposition to my own private opinion, and to the authority of Sir Thomas Frankland, who communicated to me a specimen of *C. urceolata* under that name.

41. *C. fusca*. T. 95.

42. *C. fucoides*. T. 75.

43. *C. villosa*. T. 37.

- 44. *C. imbricata*, as above mentioned, is *C. equisetifolia*. T. 54.
 - 45. *C. coccinea*. T. 36.
 - 46. *C. pennata*. T. 86.
 - 47. *C. parasitica* of English Botany, t. 1429, and of my Synopsis.
 - 48. *C. agagrophila*. T. 87.
-

I AM proud to acknowledge the flattering manner in which most of those Botanists who are distinguished by their knowledge of the submerged Algæ have assisted me in this work. Mr. Turner in the most friendly manner has exerted himself to procure and give me all the information in his power, and to him I am indebted for the descriptions of *C. arbuscula*, *agagrophila*, *orthotrichi*, and *pellucida*. Sir Thomas Frankland, Bart. and the Rev. Hugh Davies, have obligingly communicated some authentic specimens in their possession, and thereby enabled me to fix the synonymy of several of Hudson's species, with greater certainty than would otherwise have been possible. To James Brodie, Esq. Joseph Woods, junr. Esq. William Jackson Hooker, Esq. William Borrer, junr. Esq. Miss Hutchins, and Mr. William Weston Young, I am indebted for the discovery of many new species, and I am still further indebted to Mr. Hooker and Mr. Woods for several beautiful drawings with which they have favored me, nor must I omit to acknowledge the service which that part of my undertaking has received from the professional talents of Mr. Young. I have also to thank Dr. Turton for his readiness at all times to assist me. To the Right Hon. Sir Joseph Banks I am under great obligation for the free access which he has allowed me to his invaluable Library and Herbarium; and to Dr. Williams, Professor of Botany, at Oxford, for the opportunity he has liberally afforded me of examining the specimens in the Dillenian Herbarium.

SYNOPSIS OF THE BRITISH CONFERVÆ.

With Notes, and a Description of the Species not elsewhere
mentioned in this Work.

The descriptions which I have marked with an asterisk are taken from dried specimens.

A. *Subarticulata*.†

1. *dichotoma*. C. filis subarticulatis dichotomis, **fasciculatis**, strictis, fastigiatis, viridibus; ramis elongatis, remotis. T. 15.

What I have described as capsules under this species, Dr. Roth supposes to be the eggs of insects, and I regret that I have since had no opportunity of re-examining them. Mr. Turner has observed, that when kept but a short time in water they fall off in great numbers, but he says that their appearance is precisely similar to that of the capsules of other *Vaucheria*.

† The four first species of this division belong to the Vaucherian genus *Ectosperma*, lately taken up (most injudiciously in my opinion) in English Botany by the name of *Vaucheria*. The able author of the *Hist. des Conf. d'eau douce* has described many plants as distinct species of this genus, of which by far the larger part have been found in Britain, but, as has already been observed in the introduction to this work, p. 17, I have every reason to believe that these, instead of being ranked as species, do not even deserve to be considered as varieties, all of them depending upon the capsules, of which the number and situation vary in the same individual. I have therefore not only here omitted to notice them, as I thought that the so doing would unnecessarily swell the number of my species, but I even doubt whether of the four here described the three latter are specifically distinct from each other.

2. *amphibia*. *C. filis subarticulatis, ramosis, densissimè implexis, obscure viridibus; ramis sparsis, patentibus, remotis.* T. 43.
3. *vesicata*. *C. filis subarticulatis, ramosis, rigidis, fusco-viridibus; vesiculis innatis, solitariis, ellipticis, filamentis latoribus.* T. 74.

Ectosperma sessilis. VAUCHER. *Hist. des Conf.* p. 31. t. 2. f. 7. *Eng. Bot.* t. 1765.

4. *Dillwynii*. *C. filis subarticulatis, procumbentibus, ramosis, viridibus; ramis subdichotomis, alternis.*

C. frigida. T. 16.

C. Dillwynii. WEBER and MOHR. *Groß. Brit. Conf.* II. p. 14. t. 16.

Ceramium Dillwynii. ROTH. *Cat. Bot.* III. p. 117.

Ectosperma terrestris. VAUCHER. *Hist. des Conf.* p. 27. t. 2. f. 3.

C. frigida of Roth, to which I had erroneously referred this species, is my *C. muralis*, and probably the plant designed in English Botany under the name of *V. geminata*, t. 1766, is nothing more than this species, as I have seen similar fruit both upon *C. amphibia* and *C. Dillwynii*.

5. *Myochrous*. *C. filis subarticulatis, ramosis, implexis, fuscis; ramis simplicibus, subsecundis, geminis, incurvis.* T. 19.

Since the publication of this species, Mr. Woods and myself have found it in various parts of Wales, and Miss Hutchins has gathered it in the neighbourhood of Bantry. Mr. Hooker and Mr. Borrer brought last year from the cave in the Isle of Skye, called Sloch Altramine, a variety of this species, of a dark green color and loose mode of growth, with filaments above an inch long.

6. *Comoides*. *C. filis subarticulatis, ramosis, ferrugineis; ramis sparsis, remotiusculis, apice acuminatis.* T. 27.

Since I published the description of this species, it has been found at Yarmouth by Mr. Turner, and in Suffex by Mr. Borrer, and by Mr. Woods at Dover. It seems probable that *C. rufa* of Roth's *Cat. Bot.* III. p. 280, is the same plant, in confirmation of which, and of the opinion given in

the note at the beginning of this section, and in the introduction as to the *Ectosperma*, I copy the following Extract from a Letter from the late Dr. Mohr to Mr. Turner.

“ Taking this plant for the true *C. comoides* of Dillwyn, I soaked my original specimen of it, and what did I find? An *Ectosperma* of the Rev. M. Vaucher, but as Dr. Roth has remarked, without capsules as they are called. I hardly think there is more than one species of *Ectosperma* in the world, (which may seem very paradoxical) but if there are more to be distinguished, you will allow it can only be done by regarding the Vaucherian grains or Rothian capsules.”

B. *articulate, filis cylindricis.*

a. *articulis brevissimis.*†

* *simplices.*

7. *fontinalis.* C. filis simplicibus strictis, brevibus fasciatis, atro virentibus; dissepimentis distinctis; articulis brevissimis. T. 64.

From the descriptions in the third fasciculus of the *Catalecta Botanica*, it may be doubted whether Dr. Roth's *C. limosa* is not *C. fontinalis* of Hudson, and vice versa.

8. *limosa.* C. filis simplicibus, strictis, tenuissimis, fasciatis lubricis, mucosis, cœruleo-virentibus; dissepimentis obsoletis; articulis brevissimis. T. 20.
9. *decorticans.* C. filis simplicibus, curvis, tenuissimis fasciatis, densissimè contextis, cœruleo-virentibus; dissepimentis obsoletis; articulis brevissimis. T. 26 and T. A.

C. violacea. Fl. Ang. p. 592.

C. confragosa. Fl. Scot. p. 976.

† In this division are comprehended the *Oscillatorie* of Vaucher, a most distinct and natural tribe of Confervæ, which will in all probability hereafter form a separate genus. I exceedingly regret that I have not been able to find a more happy definition of this division, not knowing, as is already observed in the Introduction, how to characterise the particular structure of the joints, which seem unlike those of all other Confervæ.

C. mucosa confragilis rivulis immersens. DILL. Hist. Musc. p. 15. t. 2. f. 4.

In the supplementary plate *A* I have given a highly magnified drawing by Mr. Young, of the appearance of capsules on this species, which is described in my introduction. Although there can be scarcely any doubt of the propriety of the above references, as has been mentioned in my remarks on Hudson's species, yet more than one species having been described under the name of *violacea*, I have thought it best to retain that of *deorticans*, by which it is now generally known, and which is very characteristic of the plant.

10. *muralis.* C. filis simplicibus, curvis, longis, rigidiusculis, sparsis, fasciatis viridibus; articulis brevissimis. T. 7.

C. muralis. ROTH. Cat. Bot. III. p. 189.

C. frigida. Cat. Bot. I. p. 166. Fl. Germ. III. pars. 1. p. 491.

11. *confervicola.* C. filis simplicibus, abbreviatis, fasciculatis, liberis, fasciatis, intensè æruginosis, apice acuminatis; articulis brevissimis. T. 8. and T. *A*.

Since the publication of this species, Mr. Hooker has discovered on some specimens, capsules furrounded by a pellucid limbus, and transversely divided by a pellucid line in the same manner as those of *C. interrupta*. The acuminate apices of this species and of *C. scopulorum*, have always made me doubtful whether they should be regarded as true *Oscillatorie*, and this suspicion has been strengthened by Mr. Hooker's discovery. For the highly magnified sketch of one of these capsules, made from a recent specimen and given in my supplementary plate *A*, I am indebted to Mr. Hooker.

- 12.* *scopulorum.* C. filis simplicibus, curvis, abbreviatis, fasciatis, atro-virentibus, basi per viscositatem coherentibus, apice attenuatis; articulis brevissimis. T. *A*.

C. scopulorum. WEBER and MOHR *Reise durch Schweden*, p. 195. T. 3.

f. 3. ROTH, Cat. Bot. III. p. 191.

On Planks in the Sea, between Bognor and Aldwick; Mr. Borrer.

Rocks by the Sea side at Cawfie, Murrayshire; *Mr. Hooker* and *Mr. Borrer*.

Mr. Hooker by comparing the plants gathered in the above mentioned places with Mr. Turner's authentic specimens from Dr. Mohr, ascertained the propriety of the present reference. It is nearly allied to *C. confervicola*, but differs in its far darker color, shorter filaments, and in the singular manner by which they appear agglutinated together towards the base. The drawing in the supplementary plate A was made from a dried specimen by Mr. Hooker. The plant is represented of its natural size, and also when magnified with powers 3 and 2 of a compound microscope.

** *coadunata*.

13. *vaginata*. *C. filis in vaginâ ramofo-fasciculatis, abbreviatis, cœruleo-virescentibus; articulis brevissimis. T. 99.*

C. vaginata. Eng. Bot. t. 1995.

Since I published the description of this species, it has been found by Miss Hutchins, growing on *Hypnum prælongum* in the neighbourhood of Bantry.

14. *mirabilis*. *C. filis spurie ramosis, breviusculis strictis, cœruleo-virescentibus; ramis e coadunatis genuflexuris filamentorum; articulis brevissimis. T. 96.*

- 15.* *majuscula*. *C. filis spurie ramosis, crispatis, elongatis, laxè implicatis, atro virescentibus; ramis e filamentis coadunatis; articulis brevissimis. T. A.*

In the Sea. On Santon Sands, near Plymouth; *Miss Hill*. Bantry Bay; *Miss Hutchins*.

This species is nearly allied to *C. distorta* and *C. mirabilis*, the branches being sometimes united in the manner of the former, and sometimes as in the latter. It may be distinguished from both of these, as well as from the other *Oscillatoria*, by its remarkably curled and twisted filaments, and by

their somewhat greater diameter. It grows in thick tufts, not unfrequently three inches in length, and of a very dark blackish green color. For the drawing, which is made from a dried specimen, and represents the filaments when magnified with powers 2 and 1, I am indebted to my friend Mr. Hooker.

16. *distorta*. C. filis spurie ramosis, sub-strictis, cœruleo-virescentibus; ramis e filamentis coadunatis, distortis; articulis brevissimis. T. 22 and T. A.

The figure of this plant, T. 22, is erroneous as far as relates to the branches, which instead of being as there represented, appear rather to be merely different filaments united together in the same way as those of *C. mirabilis*. The affinity between these two species is very strong, and the leading difference seems to be that in *C. mirabilis* the sides of the two filaments are joined and continue longitudinally united, whereas in *C. distorta* the end only of one filament is attached to the side of another. This curious union is represented in my supplementary plate A, as it appears with power 1 of the microscope, and also the fructification which I have described in the introduction to this work.

b. *articulis longis*.

* *simplices*.

17. *zonata*. C. filis simplicibus, tenuibus, lubricis, virescentibus; articulis diametrum longitudine vix superantibus, granulis in fascias latas coarcevat.

C. zonata. WEBER and MOHR. *Reise durch Schweden*, p. 97. T. 1. f. 7.

a. b. ROTH. *Cat. Bot.* III. p. 269.

C. lubrica. T. 47.

Found lately at Lound, near Yarmouth, by Mr. Hooker, and in Suffex by Mr. Borrer.

18. *rivularis*. C. filis simplicibus, tenuibus, longissimis, densè compactis, plerumque contortis, intensè viridibus; articulis diametro fœsqui longioribus. T. 39.

β. aculeata. Spinulis ramuliformibus. T. A.

I first discovered the present supposed variety in company with my friend Joseph Woods, junr. in some dark shady rills on Finchly Common, and afterwards in a shady well on Stamford Hill, and in a similar well near Yarmouth. It may be at once distinguished by the naked eye from the more common state of *C. rivularis* by its still darker color, but under the microscope it appears to differ only in its numerous short spine-like processes, of which the joints resemble those of the main filament, except that they become gradually narrower, and at length terminate in a fine point. These thorn-like processes bear a considerable resemblance to the ramuli of *C. lubrica*, both in the size, shape and irregularity of their disposition, but of their nature I am still unable to satisfy myself further than that for reasons given in my introduction, they are not occasioned by a proliferous germination. The drawing at figure 3 of the supplementary plate A, was made in 1802, with power 1 of my microscope, from the plant which I then gathered near Finchly. With the sketches marked 1 and 2 (of which the former represents the plant when slightly, and the latter when highly magnified) I have been favored by Mr. Woods, who has since discovered this appearance of the species in several places about London. It grows not like the foregoing in springs, but in pools and ditches which are dried up early in the summer, and ought perhaps to be regarded as a separate variety. Some of the filaments are entirely simple, and these resemble those of *C. rivularis*; in others there are a few acuminate processes similar to those above mentioned, whilst others are beset with crowded processes of various lengths, and of these the longest are less acuminate than the others, and are again sometimes furnished with other extremely short secondary spines.

19. *bipartita.* C. filis simplicibus, tenuibus, longissimis dense compactis, flavo-virentibus; articulis diametro sub-triplo longioribus, demum bipartitis. T. 105.

20. *fugacissima*. *C. filis simplicibus tenuibus flavo virentibus; articulis pellucidis medio fœpe granulis fasciatis, diametro sub-fesquilongioribus.* P. B.

C. fugacissima. ROTH. *Cat. Bot.* III. p. 176.

Frequent in Pools and Ditches, adhering to glass and other substances.

In Mr. Turner's Herbarium there are two specimens from Dr. Roth, marked *C. fugacissima*, of which one belongs to *C. sordida*, and the other to the present species. It is most nearly allied to *C. sordida*, but may be at once distinguished by its far shorter joints. By drying *C. fugacissima* loses its color, and gradually becomes of a dirty white. The sketch at Plate B. represents a filament magnified 1.

21. *sordida*. *C. filis simplicibus, tenuibus, flavo virentibus; articulis pellucidis, diametro quadruplo longioribus.* T. 60.
22. *alternata*. *C. filis simplicibus, tenuibus, glauco virescentibus; articulis hic illic inflatis, alternatim pellucidis obscurisque, diametro fesquilongioribus.*

Prolifera vesicata. VAUCHER. *Hist. des Conferves*, p. 132. t. 14. f. 4.
(exc. syn.)

C. fuscescens, filis fuscescentibus, T. B.

In a rivulet near Swansea; β . In ditches at Stoke Newington; Mr. Woods. On decayed leaves in the ditches at Heigham, near Norwich; Mr. Hooker. Ditches about Belfast; Mr. Templeton. Pools near Bantry; Miss Hutchins.

The filaments grow in loosely entangled masses, six or eight inches in length, and are of about the same diameter as those of *C. sordida*. The color of the plant, which I once gathered near Swansea, agreed with Vaucher's description and was of a glaucous green. The joints are alternately opaque and pellucid, and some of them in almost every filament are remarkably inflated, by which this species may be readily distinguished from its congeners. The variety β . appears to differ in no other respect

than in being of a brown color, and of this Mr. Hooker favored me with the magnified sketch given in my supplementary plate B.

23. *fasciata*. C. filis simplicibus, tenuibus, mucosis, purpureo-fuscis; articulis medio fasciâ angustâ transversim notatis, longitudine diametrum æquantibus. T. B.

On decaying sticks, leaves, &c. in a ditch at Stoke Newington; *Joseph Woods, junr. Esq.*

Mr. Woods discovered this species growing in slippery masses about one and a half inch long, of a purple brown color, and forming a thick coat over decaying substances in a ditch at Stoke Newington. The length and diameter of the joints is equal, and in the middle of each there is the appearance of a dark narrow transverse band, which however proceeds from the internal organization of the plant, and therefore appears somewhat shorter than the diameter of the filament. For the drawing in my supplementary plate B, which was made with power 1 of the microscope, I am indebted to my friend Mr. Woods.

24. *lineata*. C. filis simplicibus tenuibus, fragilibus, fuscis; dissepimentis contractis; articulis lineâ unâ alterave tenuissimâ transversim striatis, diametro sub-triplo longioribus. T. B.

Among the leaves of water plants in the River Lea at Walthamstow.

In March, 1802, I found a single small specimen of this species among a jelly-like substance of the Tremella kind, which almost covers the water plants in the Lea at Walthamstow. The filaments are simple, very brittle, contracted at the dissepiments, and of a brown color. The length of the joints in some filaments is about thrice, and in others not more than twice the diameter, and they are generally marked with one or two transverse lines at uncertain distances from each other. I have not since been able to find more than a few imperfect filaments of this plant, and in one of these now before me, I observe one or two joints much shorter than the others, whose length scarcely exceeds the diameter, and which in appearance some-

what approach those of the following species before they assume their oval form. The general appearance of the two plants is however entirely dissimilar, but Dr. Roth's account of the wonderful changes which he has observed in his *C. annulina*, almost induce me to suspect that they may possibly both belong to the same species. For the lower of the two sketches in Tab. B, I am indebted to my friend Mr. Woods, and they are both made with the highest power of a compound microscope.

25. *nummuloides*. *C. filis simplicibus, tenuibus, fragilibus, fusco aureis; articulis diametro sub-brevioribus, demum in glomerules sub-ovales, moniliformes, approximates mutatis. T. B.*

Among the leaves of water plants in the River Lea at Walthamstow.

In March, 1802, I found a few detached filaments of the present plant, mixed with those of *C. lineata*, among the Tremella-like slime with which, as before mentioned, many of the plants in the River Lea are covered. I have not discovered any filaments which appear to be at all perfect, but they seem sufficiently so to prove that the plant differs materially from every other British species, and by publishing this imperfect account I trust that I shall induce some other Botanist to search for it, and more completely ascertain its nature. The filaments are cylindrical, of a brittle nature, and reddish, yellowish, or yellowish brown color. The internal vesicles which constitute the joints appear to be at first cylindrical, but at length collapse into an oval form, so as to give the filaments when highly magnified, some resemblance to a series of guineas. The length of their joints is generally somewhat less than their diameter. *C. nummuloides*, although specifically distinct, appears to possess some affinity with a species figured in the 4th Vol. of the Stockholm Transactions, under the name of *C. moniliformis*. The drawing in the supplementary plate B, represents the filaments when magnified with power 1.

26. *punctalis*. *C. filis simplicibus, tenuissimis, longis, viridescentibus; articulis diametro sub-duplo longioribus, fusco in globulum solitarium demum congesto. T. 51.*

- 27.* *Mucosa*. C. filis simplicibus, tenuissimis, lubricis, luteo virescentibus; articulis sub-torosis, longitudine diametrum æquantibus. T. B.

In stagnant Pools about Bantry. *Miss Hutchins.*

The gelatinous nature of this *Confervæ* makes it very difficult to investigate its real nature after it has been dried, in which state alone I have at present seen it. It is then scarcely distinguishable by the naked eye from *C. spiralis*, which it resembles both in its color, the mode of its growth, and the size of its filaments, though under a microscope the internal structure appears so widely dissimilar. There is however a strong peculiarity in it even in this state, that its excessively gelatinous texture prevents the filaments from cohering together, or even touching each other, and they lie quite distinct upon the paper. Miss Hutchins remarks that it has when recent a beautiful color. For the magnified drawing in my supplementary plate B, I am indebted to Mr. Hooker, but it was unavoidably made from a specimen which had been dried.

- 28.* *implexa*. C. filis simplicibus, crispato-implexis, tenuibus, mollibus, intensè lurido viridibus; articulis diametro sesquialongioribus. T. B.

On Rocks in the Sea near Bantry. *Miss Hutchins.*

This species is nearly allied to *C. tortuosa*, but the filaments are more entangled and slender, the texture less rigid, and the joints shorter. The drawing in plate B was made by Mr. Hooker, with power 1. of his microscope, from a specimen which had been dried.

29. *tortuosa*. C. filis simplicibus, rigidiusculis, crispatis, implicatis tenuibus intensè viridibus; articulis diametro triplo longioribus. T. 46.
30. *crispa*. C. filis simplicibus, rigidiusculis, crispatis, proliferis, laxè implicatis, crassiusculis, viridibus; articulis diametrò sub-triplo longioribus, siccitate alternatim compressis. T. B.

C. capillaris. Sp. Plant. p. 1636 (excl. Syn.) ROTH. Fl. Germ. III. pars. 1. p. 502. Cat. Bot. III. p. 261.

Prolifera crispa. VAUCHER. Hist. des Conf. d'eau douce, p. 130. t. 14. f. 2.

In a rapid streamlet at Costesly, Norfolk. *W. J. Hooker, Esq.*

Mr. Hooker, who alone has discovered this species in Britain, informs me that he has seen the filaments carried out by the current to the length of fifteen or twenty feet: their thickness is somewhat greater than that of *C. tortuosa*, from which it may be at once distinguished by its longer joints, as well as by the curious manner in which they become alternately compressed when the plant is dried without pressure. Mr. Hooker has discovered lateral acuminate processes issuing from the filaments, precisely similar to those which Vaucher has figured on his *Prolifera crispata*, and the plant in other respects so far accords with his description, as to leave no doubt of the propriety of the above reference. He informs me that there is a specimen of this species preserved in the Linnæan Herbarium, with the name of *C. capillaris*, but Linnæus in his description refers to the *Historia Muscorum*, and it is certain that the species there figured is what I have represented at T. 9. I cannot therefore see the necessity for any alteration, which as that plant is now almost universally known by the name of *capillaris* would in my opinion only tend to confusion. The drawing at plate B, for which I am indebted to the liberality of Mr. Hooker, represents *C. crispata* magnified 2.

31. *capillaris*. *C. filis simplicibus, rigidiusculis, crispatis, fragilibus, laxè implicatis, crassis, viridibus; articulis diametrum longitudine vix æquantibus.*
T. 9.

β. *minor*. *Filis triplo tenuioribus.*

For reasons given in the foregoing observations on *C. crispata*, my former reference to the species *Plantarum* should have been omitted. Mr. Hooker favored me with specimens of what I have here arranged as a variety, which he discovered growing mixed with *C. crispata*, far from the neighbourhood of the sea, in the river at Hellefdon, near Norwich. The filaments are thrice more slender than those of *C. capillaris*, which with its different place of growth, seems to indicate that it should constitute a separate

species, and I regret therefore that I am unable to discover any other distinctive mark whatsoever.

32. *area*. *C. filis simplicibus, rigidis, strictis, crassis, prafinis; articulis diametro brevioribus, demum bipartitis.* T. 80.

β. lubrica. Filis lubricis, mollibus.

C. area. Eng. Bot. t. 1929.

This curious variety, which was found on the Yarmouth Beach by Mr. Hooker, in the spring of 1808, attached to a piece of deal, differs so extraordinarily from the common appearance of *C. area*, that except under a microscope nobody would suspect them of being the same. It grew in a very large tuft, and its filaments were remarkably soft, tender, slippery and glossy, so as to float with the slightest agitation of the water and adhere closely to paper and glass in drying.

- 33.* *Melagonium.* *C. filis simplicibus, rigidis, strictis, crassis, prafinis; articulis diametro sub-triplo longioribus.* T. B.

C. Melagonium. WEBER and MOHR. *Reise durch Schweden*, p. 194, t. 3. f. 2. a. 6. ROTH. *Cat. Bot.* III. p. 254.

In the Sea, near Newton Nottage, Glamorgan; *Mr. Young.* Near Bantry, not common; *Miss Hutchins.* Once found on the shore near Swansea.

The mode of growth, color and habit of this plant, which was first discovered on the coast of Sweden by Messrs. Weber and Mohr, are precisely similar to those of *C. area*, from which it differs in the somewhat greater thickness of its filaments, and greater length of its joints. It was *C. melagonium* of which some years ago I found a single filament on the shore near Swansea, and which I then considered as a variety of *C. area*, and as such it is mentioned in my description of that species. The drawing at T. B. was made by Mr. Hooker from a dried specimen, and represents the plant of its natural size, and also when magnified 3.

** *conjugatæ*. †

34. *nitida*. *C. filis simplicibus, demum conjugatis, atro viridibus, splendor lubricis; granulis in spiras plures, arctas, dispositis; articulis diametrum longitudine sub-æquantibus.* T. 4. f. C.

C. nitida. Fl. Dan. t. 819, and *C. jugalis*, t. 883.

Conjugata princeps. VAUCHER. *Hist. des Conf. d'eau douce*, p. 64. t. 4.

35. *decimina*. *C. filis simplicibus, demum conjugatis viridibus, splendor lubricis; granulis in spiras duas laxas dispositis; articulis diametro sex-duplo longioribus.*

C. decimina. MULLER in *Nova Acta Petrop.* III. p. 94. t. 2.

C. nitida. T. 4. f. A. B. and *C. jugalis*, T. 5.

C. fetiformis β. ROTH. *Cat. Bot. and Fl. Germ.*

It will be immediately perceived that the specific characters which separate this species from the foregoing, lie in the different lengths of their joints, the very dissimilar arrangement of their spires, and the dark almost black green of the one contrasted with the paler hue of the other. In both these species, Mr. Turner and myself have observed that the granules are sometimes found, either from peculiarity of situation or from disease, scattered irregularly all over the joints, instead of preserving their natural spiral disposition; and in some individuals there are no traces of these whatever, though at the same time there is no appearance of their ever having been conjugated.

36. *longata*. *C. filis simplicibus, demum conjugatis, flavo-virentibus, lubricis; granulis in spiram unicam laxam dispositis; articulis diametro quadruplo longioribus.*

† In this division are comprised the *Confervæ* referred by Vaucher to his genus *Conjugata*, a particularly natural and interesting family, which I have described in my Introduction, p. 17. I am sorry that I cannot follow this excellent Botanist in adopting all the species which he has described, but I have been led by my own observations to divide *C. nitida*, *C. spiralis*, and *C. bipunctata* each into two separate species, in doing which I hope I have been correct, though I am far from feeling certain on the subject.

C. longata. VAUCHER. *Hist. des Conf. d'eau douce*, p. 71. t. 6. f. 1.

A part of the filaments represented in T. 3. f. A. belongs to this, and a part to the following species. The spires are sometimes though rarely, double, but even in this state it may be distinguished from *C. decimina* by its more slender filaments and somewhat shorter joints. I have never seen a specimen of *C. inflata* of English Botany, but am led by the description and figure to suspect that it is not distinct from this species.

37. *spiralis*. *C. filis simplicibus, demum conjugatis, flavo-virentibus; granulis in spiram unicam compactam dispositis; articulis diametro sub-duplo longioribus*. T. 3. f. C. and T. C.

C. porticalis. VAUCHER. *Hist. des Conf.* p. 66. t. 5. f. 1. (exc. Syn. Mulleri.)

Since the Introduction was printed, a curious specimen of this species has been gathered by Mr. E. Horne, at Clapham, and examined by Mr. Woods, who gives the following account of it. "The plant is a pale dirty green nearly without gloss, about the usual size of *C. spiralis*; when magnified, the length of the joints is seen to be about equal to their width or a little more, and the spiral tube is in most parts nearly obliterated, but the chief singularity of this plant is in the connecting processes which are uniformly at the ends, instead of as usual in the middle of the joints; and each of which appears to unite with the process of the next joint of the same filament. No indication of the conjugation of two filaments is to be observed; the dark globules appear only where the two joints are thus connected, and the adjacent one is uniformly empty.

38. *bipunctata*. *C. filis simplicibus, demum conjugatis, viridi flavescens, lubricis; articulis bipunctatis, diametro sub-sesqui longioribus*. T. 2.

VAUCHER.

Mr. Hooker informs me that he has lately found this species, with the joints separated like those of *C. flocculosa*, and that, when separated, the joints became rounded at the corners, and the internal masses completely

spherical. Soon after my description of this species went to press, Mr. Woods discovered it with the filaments conjugated.

39. *decussata*. *C. filis simplicibus, demum conjugatis, lutescentibus, lubricis; articulis bipunctatis diametro sub-triplo longioribus.*

C. decussata. VAUCHER. *Hist. des Conf.* p. 76. t. 7. f. 3.

This species is found in the same situations and is closely allied with *C. bipunctata*, but may be distinguished by its more slender filaments, the smaller size of the spots, and the greater length of its joints.

40. *genuflexa*. *C. filis simplicibus, demum hic illic genuflexis, conjugatisque, fragilibus, flavescentibus lubricis; granulis in lineas horizontales coarce-*
vatis. T. 6. and T. C.

The feed described in my Introduction, is represented in Plate C. magnified 1.

*** *anastomosantes.*

41. *reticulata*. *C. filis anastomosantibus, reticulatis, in maculas sub pentagonas coadunatis. T. 97.*

C. articulis solutis.

42. *diffiliens*. *C. filis simplicibus, strictis, fragilibus, lætè viridibus; dissipimentis plerumque solutis; articulis diametro dimidio brevioribus. T. 63.*
43. *pectinalis*. *C. filis simplicibus, strictis fragilibus, compressis cinereis, plerumque acuminatis; dissipimentis sæpe solutis; articulis diametro triplo brevioribus, medio pellucidis. T. 24.*

Drs. Mohr and Weber, in their German translations of this work, express their opinion very decidedly in favor of uniting *C. pectinalis* and *C. flocculosa*, but I must confess I have seen nothing to induce me to depart from my former sentiments that they are quite distinct.

This and the following species of the same division belong to the genus *Diatoma* of Decandolle, and are by means of *C. diffiliens* united to the other Confervæ.

- 44.* *teniaformis*. C. filis simplicibus, compressis, dilutè viridibus; dissepimentis solutis; articulis diametro dimidio brevioribus, obsoletè variegatis, demum refractis.

C. teniaformis. Eng. Bot. t. 1883.

On *Conferva fucoides* in the Sea at Beachy Head. Mr. Borrer.

- 45.* *striatula*. C. filis simplicibus, compressis dilutè viridibus; dissepimentis alternatim solutis; articulis diametro vix brevioribus, transversim striatis.

C. striatula. Eng. Bot. t. 1928.

On Fuci and *Confervæ* in the Sea at Cromer; Mr. Hooker. At Brighton, Mr. Borrer.

- 46.* *Biddulphiana*. C. filis simplicibus, compressis, longitudinaliter striatis, viridibus; dissepimentis solutis; articulis quadratis, transversim fasciatis, sub-alternatim refractis.

C. Biddulphiana. Eng. Bot. t. 1762.

On Marine Algæ at Southampton. Miss Biddulph.

This plant, which as well as the two former and *C. obliquata*, is here introduced upon the authority of English Botany, appears to be as Dr. Smith observes, really an extraordinary production, but it seems scarcely possible that all the figures in that plate should belong to the same plant, or if they do, does it not lead to a suspicion that the species of this family have been unnecessarily multiplied by authors?

47. *flocculosa*. C. filis sub-simplicibus, compressis, fascia longitudinali percurfis, cinereis; dissepimentis solutis; articulis quadratis, transversim striatis, alternatim refractis. T. 28.

- 48.* *obliquata*. C. filis ramosis, compressis, flexuosis, fusco albidis; dissepimentis solutis; articulis quadratis, obliquis, transversim fasciatis, maculatis, alternatim refractis.

C. obliquata. Eng. Bot. t. 1889.

On Fuci and *Confervæ* in the Sea. Miss Biddulph.

*C. articulata. filis setaceis.*a. *avenia.** *simplices.*

49. *flacca.* *C. filis simplicibus, tenuibus, flaccidis, læti viridibus; dissepimentis pellucidis; articulis diametro paullo brevioribus.* T. 49.

C. penicilliformis. ROTH. *Cat. Bot.* III. p. 271?

50. *Youngana.* *C. filis simplicibus, cœspitosis, flaccidis, obtusis, lætè viridibus; articulis utrinque contractis longitudine diametrum æquantibus.* T. 102.

C. ifogana. *Eng. Bot.* t. 1930.

51. *curta.* *C. filis simplicibus fasciculatis, sub-cartilagineis, abbreviatis, utrinque alternatis, fusco-olivaceis; dissepimentis pellucidis; articulis diametro sub-longioribus.* T. 76.

- 52.* *flaccida.* *C. filis simplicibus, fasciculatis, abbreviatis, flaccidis, basi latioribus apicem versus attenuatis olivaceo viridibus; articulis inferioribus diametro dimidio brevioribus, ultimis æquantibus.* T. C.

On *Fucus fibrosus* on Santon Sands, Devon. *Mifs Hill.*

This species appears to have been gathered only by Mifs Hill, who communicated it to Mr. Turner. It grows in small tufts about half an inch long, and may be distinguished from *C. curta* by its flaccid nature, and from *C. fucicola*, as well as all its other congeners, by the rather abrupt manner in which the joints of the upper part of the filament increase in length to double that of the lower part. Its substance is somewhat gelatinous, and in drying it adheres, though not very firmly, to either Glass or Paper. In the drawing at Plate C, for which I am indebted to Mr. Hooker, the plant is represented of the natural size, and when magnified with power 3, the upper and lower part of the filament are also separately represented, magnified 2.

53. *fucicola.* *C. filis simplicibus, fasciculatis, breviusculis, obtusis, ferrugineis; dissepimentis pellucidis; articulis diametro duplo-longioribus.* T. 66.

54. *carnea*. C. filis simplicibus, tenuibus, abbreviatis, carneis; articulis torosis, diametro sub-triplo longioribus; fucco in globulum solitarium congesto. T. 84.

55. *ericetorum*. C. filis simplicibus, procumbentibus, implexis, fusco-violaceis; articulis diametro duplo longioribus, demum sub-ovalibus. T. 1.

Dr. Roth in the last volume of his *Cataloga Botanica*, has described this species as branched, but I have never seen it so.

56. *fusco-purpurea*. C. filis simplicibus, ætate inæqualiter torosis, fusco-purpureis; articulis diametro dimidio brevioribus, demum serie globulorum cinctis. T. 92.

57.* *atro-purpurea*. C. filis simplicibus, ætate inæqualiter torosis, atro purpureis; articulis diametro dimidio brevioribus, demum serie duplici globulorum cinctis. T. 103.

Since the publication of this plant, specimens have been found on the Coast of Cornwall by Mr. W. Rashleigh, and communicated by him to Mr. Turner.

** *ramosa*.

58. *fenestralis*. C. filis ramosissimis, repentibus, minutissimis, centrifugis, albidis; ramis plerumque divaricatis; dissipationis sub-obsoletis. T. 94.

59.* *nivea*. C. filis ramosis, tenuissimis, rigidiusculis, niveis; ramis in verticello confertis; articulis diametrum longitudine sub-æquantibus. T. C.

Byssus lanuginosa. WILLAN, *Obs. on Sulphureous Waters*. p. 10.

In Sulphur Springs. At Croft, Yorkshire, and Dinsdale, Durham; Dr. Willan. At Middleton One Row, near Darlington; Mr. Backhouse.

Although I have not seen any other specimens of *C. nivea*, than those which I received from Darlington, yet from Dr. Willan's description there can be no doubt that it is the plant which he has described. Dr. Willan says it is a remarkable circumstance that this species is found below the spring, no further than the water retains the sensible sulphureous qualities, as if the hepatic gas was necessary to its production and nourishment.

It grows on roots and other substances, which it covers with white filaments two or three lines in length, and so extremely slender, that under the highest power of my microscope, their thickness scarcely appears equal to that of horse-hair. Some of the filaments are simple, but most of them are singularly beset towards the middle with a whirl-like cluster of very numerous simple branches resembling proliferous shoots. Dissepiments with a very high power are clearly discernable, and they divide the filaments into joints, the length and thickness of which are about equal. The drawing at table C, for which I am indebted to my friend Joseph Woods, represents the plant of the natural size and when magnified 2. A fragment is also added (on a rather larger scale than it appeared with the highest power) to shew the joints.

60. *ochracea*. C. filis ramosissimis, tenuissimis, perfragilibus, densissimè compactis, gelatinam ochraceam tamen in floccos secedentem constituentibus, dissepimentis sub-obsoletis. T. 62.
61. *lactea*. C. filis ramosis in massam informem gelatinosam confertis, hyalinis, fordidè lacteis; ramis e quovis dissepimento; articulis longissimis. T. 79.
62. *typhloderma*. C. filis sub-ramosis in pelliculam olivaceam densissimè implexis; articulis longitudine diametrum æquantibus. T. 83.
63. *sanguinea*. C. filis ramosis in pelliculam gelatinosam fanguineam, densissimè implexis; ramis divaricatis; articulis diametro sesquolongioribus.

Mr. Young discovered the present species, forming a densely matted membrane on the surface of some flintglass size, in which he had put a quantity of patent yellow to dissolve, but we have since repeatedly endeavored to produce it in the same manner without success. Its dark crimson color is of itself sufficient to distinguish it from its congeners.

64. *pallida*. C. filis dichotomis, curvato-flexuosis, fastigiatis, in pelliculam gelatinosa-coriaceam implexis, pallidè ochraceis; dichotomarum angulis rotundatis; articulis longissimis. T. 78.

- 65.* *arachnoidea*. C. filis ramosis, tenuibus, in membranam arachnoideam laxè implicatis, pallidè flavescentibus; ramis sparsis, remotis, simplicibus; articulis longitudine variantibus, diametrum sub-quadruplo superantibus. T. C.

On decayed Trees in the Wood at Croftwick near Norwich. Mr. Hooker.

I cannot find that this species has been noticed either as a *Conferva* or *Byffus*, in which latter genus it would have been most probably arranged by the older authors. It forms a fine spider-like web on decaying wood of a light yellow color. The filaments are branched, extremely slender, flaccid, and loosely entangled: the branches are simple, remote and disposed without apparent order: the dissepiments are of a dark color, and divide the filaments into joints, whose length, though variable, is most usually about four times greater than the diameter. I am not aware of its having been found by any other Botanist than Mr. Hooker, and to him I am indebted for the drawing of plate C, which represents the plant of its natural size, and also when magnified with powers 2 and 1 of his microscope.

66. *rubiginosa*. C. filis ramosissimis, rigidis, erectiusculis, rubiginosis; in massam sub-solidam implexis; articulis diametro sub-quadruplo longioribus. T. 68.
67. *phosphorea*. C. filis ramosis, adscendentibus, brevissimis, in crustam uniformem densissimè implexis, violaceis; articulis diametro sub-sesqui longioribus. T. 88.
68. *purpurea*. C. filis dichotomis cœspitosis, implexis, minutissimis, fastigiatis, purpureis; dichotomis approximatis; articulis diametro sub-duplo longioribus. T. 43.
- 69.* *lichenicola*. C. filis ramosis cœspitosis, abbreviatis, aureis, ficcitate demum cinereis; ramis longis alternis; articulis torosis, diametro sub-duplo longioribus.

C. lichenicola. Eng. Bot. t. 1607.

On Lichens. In the New Forest; *Mr. Lyell*. About Belfast; *Mr. Templeton*. In Houghton and St. Leonard's Forest, Suffex; *Mr. Borrer*.

This species is nearly related to *C. aurea*, from which some of the filaments seem scarcely to differ, except in their smaller size.

70. *aurea*. *C. filis ramosis cœspitosis, abbreviatis, aureis siccitate demum cinereis; ramis longis patentibus rigidiusculis, sub-incurvis; articulis cylindraceis, diametro sesquilogioribus.* T. 35 and T. C.

Since the publication of my description of *C. aurea* I have discovered it with capsules, which are represented in the supplementary Plate C. magnified 1. *C. ilicicola* of English Botany does not appear to me at all distinct from this species, and I have been favored by Mr. Templeton with some specimens gathered on the trunks of *Quercus ilex*, in Lord Dungannon's Park, near Belvoir, in Ireland, with capsules precisely resembling those of *C. aurea*.

- 71.* *olivacea*. *C. filis ramosis, erectis, cœspitosis, implexis, abbreviatis, rigidiusculis, fusco olivaceis; ramis subsimplicibus, alternis, obtusis; articulis longitudine diametrum æquantibus.* T. C.

On Marine Rocks in Papa Westra, Orkneys. *Mr. Borrer* and *Mr. Hooker*.

I am indebted to Mr. Borrer for specimens of this hitherto nondescript species, which, in company with Mr. Hooker, he discovered during their late tour through Scotland. The filaments of a brownish olive color, are not more than a quarter of an inch in length, and grow so matted together as to form a minute turf on the rocks. It may be distinguished from *C. radicans*, to which it seems most nearly allied, by its different mode of growth, shorter filaments and longer joints. The drawing was made by Mr. Hooker from a dried specimen, and represents a filament when magnified with powers 3, 2 and 1 of his microscope.

- 72.* *radicans*. *C. filis ramosis hic illic radicantibus, strictis, rigidiusculis, fusco olivaceis; ramis simplicibus, sparsis, erectis, obtusis, basi attenuatis; articulis diametro sub-dimidio brevioribus.* T. C.

On sandy Banks among the Rocks in Bantry Bay; *Miss Hutchins.*
Rocks at Hartlepool; *Mr. Backhouse.*

Miss Hutchins first discovered this species of *Conferva* in the neighbourhood of Bantry, and the present description is made from a drawing and specimens which she sent to Mr. Turner. The filaments grow to the length of about half an inch, and according to Miss Hutchins's observations throw out fibrous roots towards their base. The color is of a brownish olive: the branches, which are erect and disposed without order, are uniformly simple with obtuse apices. The joints are about equal to half of the diameter. The fructification is in capules which are mostly sessile, numerous, and disposed on the filaments without order. The substance is rather stiff and not in the least gelatinous, so that in drying it adheres to neither glass nor paper. The drawing at plate *C* was made by Miss Hutchins from the recent plant, and represents it both of its natural size and when magnified 3, to which Mr. Hooker, from a dried specimen, has added a piece of a filament magnified 1.

73. *Brownii.* *C. filis ramosis, densè cœspitosis, rigidiusculis, abbreviatis, viridibus; ramis ramulisque sub-secundis; articulis apice plerumque incrassatis, diametro sub-quintuplo longioribus. T. D.*

On Wet Rocks in a Cave near Dunree, Ireland. *Mr. Robert Brown.*

This plant I introduce entirely on the authority of Mr. Brown, who considers it as a distinct species, and to whose judgment in all matters relating to Botany, the greatest deference is due. He alone has observed it, and I have a pleasure in publishing it with his name. The following description was made by Mr. Brown from recent specimens. "In cœspitibus densis nunc convexis nunc planiusculis latioribusque. Filamenta (quasi fasciculata) erecta, ramosissima, $1\frac{1}{2}$ ad 2 lineas longa, crassiuscula, rigidula; ramis sub-secundis, dichotomi; articulis multoties longioribus quam latis, pluribus apicem versus sensim incrassatis, paucis cylindricis. Fructificatio nulla viva." The ramifications and joints are so nearly similar to those of *C.*

egagropila that I apprehend it can only be distinguished from that species by its very different mode of growth. For the drawing which represents *C. Brownii* of the natural size, and when magnified 3 and 1, I am indebted to the kindness of my friend Joseph Woods.

- 74.* *cryptarum*. *C. filis dichotomo-ramosis, repentibus, viridibus; ramis divaricatis acuminatis, articulis diametro sub-triplo longioribus.* T. D.

In Caves. North of Ireland; *Mr. R. Brown*. In the first Cave on the Cave Hill near Belfast, growing among *Hypnum teneolum*; *Mr. Templeton*. In Caves by the Sea-side near Bantry; *Mrs Hutchins*.

Mr. R. Brown, who first discovered this plant several years ago, favored me with a specimen under the present name. It is of about the size of *C. velutina*, but its mode of ramification is widely different. The magnified drawing at plate C was made from a dried specimen by *Mr. Hooker*.

75. *velutina*. *C. filis ramosis, repentibus, abbreviatis, pulvinatis, implexis, lætè viridibus; ramis erectis obtusis; articulis diametro multiplo longioribus.* T. 77.
76. *umbrosa*. *C. filis ramosis repentibus, abbreviatis, fragilibus, nigro viridibus; ramis curvis, simplicibus, sub secundis, obtusis, articulis cylindræis inflatisque longitudine variantibus.* T. 61.
77. *multicapularis*. *C. filis ramosis, repentibus, nigro-olivaceis; ramis erectis, simpliciusculis, brevibus, apicem versus incrassatis & capfuliferis; capfulis congestis, articulis longitudine variantibus.* T. 71 and T. D.

At Plate D is represented an extraordinary appearance of this species, which I have observed since my description was published in a specimen gathered near Swansea. The drawing was made by *Mr. Young*.

78. *pulveria*. *C. filis dichotomo-ramosis, repentibus, minutissimis, apice capfuliferis, æruginosis; dissipimentis sub-obsoletis, articulis diametro triplo longioribus.* T. D.

Byssus æruginosa. *Fl. Ang.* p. 605. *Withering.* IV. p. 143.

On the Stems of dead Fern; *Col. in Dillenius*. On rotten Wood;

Hudson. On the Pillars of Roslyn Chapel near Edinburgh; *Dr. Smith.* On the Ruins of the Chapter House at Margam, and the Walls of Oystermouth Castle, Glamorgan; *Mr. Young.*

This species, for the discovery of which I am indebted to Mr. Young, so nearly accords with the description in the *Historia Muscorum*, that I feel no hesitation in publishing it as the *Byssus aruginosa* of Hudson. It is an extremely minute species, of a bluish green color, and rather powdery appearance. When examined with the highest powers of the microscope, the filaments are seen to be twice or thrice dichotomous, and dissepiments may be here and there observed, dividing them into joints, whose length is about equal to three times their diameter. Mr. Young remarked that the branches are sometimes singularly reflected. On the termination of each branch there are generally two oval bodies of a dark green color, which I suppose are either capsules or naked seeds, but they are so minute, that it is impossible to speak with any certainty of their nature, and it is these which give the plant its powdery appearance.

The drawing at Plate D was made by Mr. Young, and represents the plant both of its natural size and when magnified with the highest power of a compound microscope.

79. *ebenea.* C. filis ramosis, erectis, abbreviatis, cartilagineis, nigris; ramis ramulisque obtusis; articulis diametrum longitudine æquantibus. T. 101.
 80. *atro-virens.* C. filis ramosis, rigidiusculis, atro-virentibus; ramis subsecundis utrinque attenuatis; articulis brevissimis tripunctatis. T. 25 and T. D.

Lichen exilis. AUCTORUM.

The fructification of this species, which I discovered on some specimens gathered near Béddegellart, is represented at plate D magnified 1.

- 81.* *ocellata.* C. filis ramosis, flaccidis, intra moniliformibus, fuscescentibus; ramis subsecundis, remotis elongatis, simplicibus; articulis diametro dimidio brevioribus, centro sæpè notatis. T. D.

On a Bog on Town Hill Common, near Southampton. *Joseph Woods*,
Junnr. Eq.

I am obliged to Mr. Woods for the sketch and specimens from which I have taken this description, and which are the only ones I have ever seen of this singular species. The filaments do not appear to possess any real dissepiments, but a chain of bead-like globose vesicles, considerably narrower than themselves pass through them, in the center of most of which another concentric vesicle may be observed. The filaments sometimes, like those of *C. atro virens*, are not of the same thickness throughout, and with this species *C. ocellata*, though extremely different, seems to possess most affinity. The color to the naked eye is brown, but under the microscope, when examined with a strong light, appears almost of an orange hue. The figure at plate D represents the plant as it appears when magnified with powers 2 and 1.

82. *castanea*. *C. filis ramosis, repentibus, pinnatis, acuminatis, castaneis; pinnis pinnulisque alternis, divaricatis; articulis caulis longissimis, pinnarum brevioribus.* T. 72.

Mr. Turner is of opinion that this is the *C. muscicola* of the German authors, but it does not well accord with the figure in Weber and Mohr's *Reise durch Schweden*, or Dr. Roth's description in the *Catalecta Botanica*.

83. *Acharii*. *C. filis ramosis, cœspitosis, rigidiusculis, sub-erectis, fusco-olivaceis; ramis brevibus, patentibus, apicibus obtusis; articulis diametro subduplo longioribus.* T. 89.
84. *orthotrici*. *C. filis ramosis, cœspitosis, pulvinatis, rigidiusculis, fragilibus, obtusis, castaneis; ramis sub-alternis; articulis diametro vix longioribus.* T. 89.
85. *chalybea*. *C. filis ramosis, pulvinatis, fastigiatis, strictis, tenuibus, erectis, nigro-viridibus; ramis sub-alternatim fecundis; ramulis lateralibus, brevissimis, multifidis, capuliferisque; articulis diametro quintuplo longioribus.* T. 91.

C. corymbifera. Eng. Bot. t. 1996.

Since this plant was described in my work, Mr. Backhouse has found some specimens of it near Darlington, as large as those sent by Dr. Roth to Mr. Turner, and exactly agreeing with them, (as well as with those from Mr. Borrer, excepting only in the greater length of their filaments). Upon these the fructification was first discovered, which is so remarkable and singular that Dr. Smith was misled by it to regard Mr. Backhouse's plant as a new species, and to publish it as above quoted in English Botany.

86. *vivipara.* C. filis dichotomo ramosis, flexuosis flavo virentibus; ramis ad dissepimenta bubiferis; bulbis piliferis; articulis diametro triplo longioribus. T. 59.

C. fetigera. ROTH. Cat. Bot. III. p. 283. t. 8. f. 1.

Since I published the description of this species it has been found in the neighbourhood of Darlington by Mr. Backhouse.

- 87.* *exigua.* C. filis ramosissimis, minutis, gelatinosis, viridibus; ramis confertis; ramulis elongatis apice pellucidis; articulis diametrum longitudine sub-æquantibus. T. D.

In the Chalybeate Stream which runs through the Bog on Apse Heath, near Shanklin, Isle of Wight. J. Woods, junr. Eq.

I received a specimen and drawing of this minute and beautiful species from my friend Mr. Woods, who informs me that its length is not greater than three sixteenths of an inch. The length of the joints in the principal branches somewhat exceeds the diameter, but those of the ramuli are shorter. This species seems nearly related to the *Rivularia*.

88. *protensa.* C. filis ramosis, lubricis, viridibus; ramis diffusis, maximè elongatis, apice pellucidis; articulis diametro sub-sesquilongioribus. T. 67.
89. *lubrica.* C. filis ramosissimis, lubricis, viridibus; ramulis sparsis, approximatis, aculeiformibus; articulis diametro saltem triplo longioribus. T. 57.

90. *mutabilis*. C. filis ramosissimis, submoniliformibus, gelatinosis, viridibus; ramulis fasciculatis, multifidis, penicilliformibus, apice protensis; articulis diametro sesquialongioribus. T. 12.
91. *gelatinosa*. C. filis ramosissimis, moniliformibus, gelatinosis, obscure viridibus; ramulis subverticillatis, multifidis, penicilliformibus; articulis ramulorum longitudine diametrum sub æquantibus. T. 32.

Since I published my description of this species, I have discovered the blue variety in Llyn Cwellyn, and examined it carefully on the spot with a compound microscope. The principal stems were entirely destitute of whirls, but the ends precisely resembled those of the plant in its common state, the color alone excepted. I am inclined to think that the singular appearance of this variety arises from disease, probably occasioned by its alpine situation, and its growth in stagnant water, but at all events it has no claim whatever to be considered a distinct species.

92. *atra*. C. filis ramosissimis, moniliformibus, sub-gelatinosis, atro-viridibus; ramulis fetaceis; articulis diametro quintuplo longioribus, supernè incrassatis, verticillato-ciliatis. T. 11 and T. D.

Since the publication of this species it has also been found at Bantry by Miss Hutchins, and near Cambridge by Mr. Relhan, who first discovered the fructification, which has been subsequently found about Yarmouth by Mr. Turner and Mr. Hooker. The fruit is large, globular, and sessile, of a dark color, and scattered plentifully over the frond, especially near the base, in which respect it differs from most other *Confervæ*. Although the powers of my microscope did not enable me satisfactorily to determine, yet I have but little doubt that these capsules resemble in their nature those of *C. gelatinosa*; they are represented in my supplementary plate D magnified 1.

- 93.* *nigricans*. C. filis dichotomis, rigidiusculis, viridi-nigricantibus; ramis longis, remotis, patentibus; articulis diametro quadruplo longioribus. T. E.

C. nigricans. ROTH. *Cat. Bot.* III. p. 277.

In a pond at Wimbledon, Surry. *Mr. Dickson.*

Mr. Dickson alone appears to have discovered this species in Britain, and to him I am indebted for the specimens now before me, which having been sent by Mr. Turner to Dr. Roth were returned with the name of *C. nigricans*. The filaments grow to the length of three or four inches, and are irregularly divided by patent dichotomies. The joints, whose length is about four times greater than the diameter, are by Dr. Roth described "sporulis ubique sparsis," and in the specimen now before me most of them are covered by dark colored spots, which however seem rather to proceed from decay or some extraneous matter attached to them. In drying it will not in the least adhere to either Glass or Paper. In Plate E the plant is represented when magnified 4 and 2, and I am indebted to my friend Mr. Hooker for the drawing, which was necessarily made from a specimen that had been previously dried.

94. *crispata*. *C. filis ramosis, crispatis, saturatè viridibus; ramis alternis, remotissimis; articulis diametro multiplo longioribus, siccitate alternatim compressis. T. 93.*

95. *pennatula*. *C. filis ramosissimis, flavescentibus; ramis ramulisque crecto-patentibus, sub-incurvis; articulis cylindraceis diametro sextuplo longioribus.*

C. pennatula. Fl. Dan. t. 945.

Ditches about Yarmouth.

Of this plant I have now no specimens, but a drawing made by myself in 1802, from some individuals gathered near Yarmouth, so exactly accords with the figure in the *Flora Danica*, that I am led to admit it as a British *Conferva*, though chiefly for the purpose of directing the attention of other Botanists to the subject, and without by any means pledging myself for its being a distinct species.

96.* *flavescens*. *C. filis ramosissimis, flexuosis flavo virentibus; ramis sub-dichotomis; patento-horizontalibus; ramulis lateralibus abbreviatis; articulis cylindraceis diametro decuplo longioribus. T. E.*

C. flavescens. ROTH. *Cat. Bot.* II. p. 224. III. p. 241. *Fl. Germ.* III. par. I. p. 511.

In the Ditches at Cley, Norfolk; *Mr. Hooker*. In the New River at Stoke Newington; *Mr. Woods*.

This species, though nearly allied to *C. fraeta*, is distinguishable by its more slender filaments and by its longer joints. The drawing at plate D was made by Mr. Hooker, and represents the plant magnified 3 and 2.

97. *fraeta*. *C. filis ramosissimis flexuosis viridibus; ramis ramulisque divaricatis sub-alternis; articulis diametro quintuplo longioribus demum oblongis.* T. 14.

This is a very variable species, so much so that in particular situations it approaches so closely both to the preceding and following one as to require sometimes great care to distinguish them. It has been already noticed in the Introduction that it is the *C. vagabunda* of Hudson.

98. *flexuosa*. *C. filis dichotomo-ramosis, rigidiusculis, saturatè viridibus; ramis flexuosis; ramulis sub-simplicibus, tenuissimis, alternatim secundis, patentibus, articulis diametro duplo longioribus.* T. 10.
- 99.* *Hutchinsia*. *C. filis ramosissimis, flexuosis, sub-cartilagineis, fragilibus, glauco viridibus; ramis ramulisque sparsis, ultimis secundis adpressis; articulis torulosis, diametro duplo longioribus.* T. 109.
100. *diffusa*. *C. filis dichotoma-ramosis, flexuosis, rigidis, viridibus; ramis diffusis remotis; ramulis brevibus approximatis, obtusis; articulis cylindraceis, diametro quadruplo longioribus.* T. 21.
101. *rupestris*. *C. filis ramosissimis, strictis, virgatis, fasciculatis, intensè viridibus; ramis adpressis, obtusis; articulis cylindraceis, diametro sub-quadruplo longioribus.* T. 23.
102. *glomerata*. *C. filis ramosissimis, rigidiusculis, viridibus; ramis alternis; ramulis brevibus, secundis, sub fastigiatis, penicilliformibus, obtusiusculis; articulis diametro quadruplo longioribus.* T. 13.

103. *latè-virens*. C. filis ramosissimis, rigidiusculis, arcuatis, lætè viridibus; ramis approximatis, acuminatis; ramulis brevibus, alternatim secundis; articulis diametro sub-triplo longioribus. T. 48.

104.* *albida*. C. filis ramosissimis, coacervatis, tenuibus, albo-virescentibus; ramis subquaternis approximatis; ramulis horizontalibus, oppositis, flexuosis, ultimis sub-secundis; articulis diametro quadruplo longioribus. T. E.

C. albida. Fl. Ang. p. 595. WITHERING. IV. p. 131.

C. marina tomentosa, tenerior, & albicans. DILL. Hist. Musc. p. 19.
t. 3. f. 12.

β. protensa. Filis in longum protensis; ramulis patentibus, strictis.

In the Sea at Cromer; Mr. Turner. *β*. Coast of Suffex; Mr. Borrer.
In Bantry Bay, not uncommon during the months of June and July;
Miss Hutchins.

By means of a fragment of the Dillenian specimen No. 12, I have been enabled to satisfy myself that the present is the same species, and consequently the *C. albida* of Hudson. I have at present seen only two dried specimens of this plant, the habit of which is so remarkably thick and clustered that it is extremely difficult to extricate a small piece so as clearly to discover the ramification. Its strongest character seems to lie in the opposite and horizontal ramuli. The color is a pale waxy yellowish green, wholly devoid of gloss. The length of the filaments is about three inches. The variety *β* is seven or eight inches long, and of a less bushy habit. Its ramuli are less regularly opposite, and are strait instead of being flexuose. Miss Hutchins says that when fresh it is of a beautiful pale green color. For the sketch at Plate E, which represents the ramuli magnified 2, I am indebted to Mr. Hooker.

105. *pellucida*. C. filis ramosissimis, strictis, rigidis, dilutè viridibus; ramis plerumque ternis, obtusis; articulis longissimis. T. 90.

106. *agagropila*. C. filis ramosissimis, viridibus, e centro progredientibus, et globum constituentibus; ramis ramulisque sub secundis, obtusis; articulis diametro quadruplo longioribus. T. 87.

- 107.* *ærugiosa*. *C. filis ramosis, flexuosis, brevibus, ærugineosis; ramis sparsis, patentibus, obtusis; articulis diametro sub-æsequilongioribus.* T. E.

C. æruginea. *Fl. Ang.* p. 595. *WITH.* IV. p. 131.

C. marina capillacea brevis, viridissima mollis. *DILL. Hist. Musc.* t. 4. f. 20.

On Fuci.

The sketch of this *Conserva* represented in the supplementary Plate E, as also the above description, is taken from the original specimen in the Dillenian Herbarium, and is published because I have seen no other British specimen that resembles it. I have neither gathered it myself, nor ever seen it in any other collection. It is from half to three-quarters of an inch in length. The drawing represents a filament magnified 1.

- 108.* *arcta*. *C. filis ramosis, strictis, virgatis, cœruleo-viridibus; ramis sub-patentibus, ultimis sparsis adpressis; articulis inferioribus, brevibus, superioribus, longissimis.* T. E.

In the Sea, Bantry Bay. *Miss Hutchins.*

My friend Mr. Turner favored me with specimens of this species, which he received from Miss Hutchins, to whom the botanical world is indebted for its discovery. It grows to the length of two or three inches, and is of a light bluish green color. The filaments are about twice divided: the branches issue at acute angles and at uncertain distances from each other; they are most commonly alternate but sometimes opposite, and a few of those near the root, in the specimen now before me, contrary to their general character, are curled inwards in a remarkable manner. The length of the joints varies; in the lower part of the filament it scarcely exceeds the diameter, but becomes longer towards the summit, and the terminal joints are remarkably long. When dried, in which state alone I have hitherto had an opportunity of observing it, it has a flaccid *Ulva* like appearance. For the drawing at Plate E, I am indebted to Mr. Hooker: the plant is represented magnified 4, and also the lower and upper end of a filament, separately, magnified 2.

109.* *lanosa*. *C. filis ramosis, brevibus, tenuibus, luteo-virescentibus; ramis sparsis; articulis inferioribus sub-duplo, ultimis multuplo diametro longioribus.* T. E.

C. lanosa. ROTH. *Cat. Bot.* III. p. 291.

β. *Zostera*. *Filis lætè viridibus, splendentibus.*

On Rocks and Algæ in the Sea. Near Forres; *Mr. Brodie*. At Cromer; *Mr. Hooker*. Anglesea; *Rev. H. Davies*. At Brighton; *Mr. Borrer*. At Ilfracombe; *Miss Hill*. Bantry Bay; *Miss Hutchins*. Between Dover and the South Foreland. ρ. On *Zostera* at Worthing; *Mr. Borrer*. On Marine Algæ, near Forres; *Mr. Brodie*.

That this species is the *C. lanosa* of Roth, I have been enabled to prove by means of authentic specimens in Mr. Turner's extensive Herbarium. I discovered it several years ago in the neighbourhood of Dover, and have since received specimens from several of my friends. The filaments are mostly about four lines, and I believe they never exceed an inch in length. The color is generally of a very dull yellowish green, wholly destitute of gloss when dry. The joints vary in length, some of those in the lower part of the filament being about equal to, and others double the diameter, but those at the terminations of the filaments are uniformly much longer than any of those below them. Mr. Hooker in the specimens which he gathered at Cromer, observed two small dark colored spots in many of the joints, but this appearance they lose in drying. The var. β. was sent me by Mr. Borrer, who found it on the Suffex coast growing on *Zostera marina*, and I have also received it from Mr. Brodie: it is of a grass-green color and is glossy, but though on this account widely different at first sight, it does not appear to be distinct from the present species. Mr. Turner has received both of these from Miss Hutchins as the same. The drawing at plate E was made by Mr. Hooker from a recent specimen, and represents the plant magnified 3, and also separately the upper and lower parts of a filament magnified 1.

110. *tomentosa*. *C. filis* ramosissimis, tenuibus, funis in formam densissimè contortis, sub-ferrugineis; ramis divaricatis, ultimis simplicibus; articulis diametro quadruplo longioribus. T. 56.

111.* *riparia*. *C. filis* infernè simpliciusculis, supernè ramosis, longis tenuibus, implexis flavo-virentibus; ramis remotis, divaricatis; articulis diametro sub duplo longioribus. T. E.

C. riparia. ROTH. *Cat. Bot.* III. p. 216.

Near Bantry; *Mrs Hutchins*. In Salt pools by the Yare, near Yarmouth.

It is on the authority of authentic specimens in Mr. Turner's Herbarium, which I have compared with those sent by Miss Hutchins, that I publish this species with the reference to Roth, upon whose description I have been under the necessity of relying for a part of my own, the filaments being so long and entangled that in a dried specimen it is almost impossible to separate them. I have a sketch which belongs to the same species, and which I made from a plant that I discovered in pools by the side of the Yare, near Yarmouth, in 1802. The filaments towards the root have but few branches, but they are more numerous towards the summits, and always remarkably divaricated. The drawing at T. E. was made by Mr. Hooker from a dried specimen, and represents, separately, the ramification and nature of the joints, magnified with powers 2 and 1 of his microscope.

112.* *filiculosa*. *C. filis* ramosissimis, tenuibus, fusco-flavescentibus; ramis ramulisque sub alternis, acuminatis; articulis diametrum longitudine æquantibus; capsulis filiculiformibus. T. E.

Ceramium confervoides. ROTH. *Cat. Bot.* I. p. 151. t. 8. f. 3. III. p. 148.

Fl. Germ. III. pars I. p. 467.

Rocks in the Sea at Cromer and Hastings. *W. J. Hooker, Esq.*

Dr. Roth and my friend Mr. Hooker are of opinion that *C. filiculosa* is specifically distinct from *C. littoralis*, to which I have thought it right to accede, never having myself had the opportunity of comparing recent

specimens of the two plants together. The principal difference which I can discover, consists in the lanceolate pods of the one, contrasted with the globular capfuls of the other, but this however I can hardly admit to be a sufficient indication of specific difference, since the same may be observed between *C. coccinea* and its variety, in *C. arbuscula*, and several other *Confervæ*, each of which should in that case be divided into two species. The drawing at Plate E was made by Mr. Hooker from the recent plant, and represents the filaments magnified 3 and 1.

113. *littoralis*. *C. filis ramosissimis, tenuibus, implexis, olivaceis; ramis ramulisque sub-alternis, acuminatis; articulis diametrum longitudine æquantibus; capfulis globosis.* T. 31.

It appears from the third fasciculus of the *Cataloga Botanica*, that Dr. Roth's *Ceramium tomentosum* belongs to the present species, and is quite different from *C. tomentosa* of Hudson, to which I had erroneously referred it. The latter is probably *Ceramium compactum* of Roth.

114. *fetida*. *C. filis ramosis, coadunatis, virgatis, apicibus liberis, olivaceis; ramis confertis; articulis diametro sesqui longioribus, granula elliptica includentibus.* T.
- 115.* *paradoxa*. *C. filis ramosis coadunatis, tenuissimis, lubricis, dilutè viridibus; ramis longis sparsis, adpressis; articulis diametrum longitudine æquantibus, granula sphaerica includentibus.* T. F.

In the Sea at Bangor; *Mr. Templeton*. Beach at Brighton; *Mr. Borrer*.

A specimen from Mr. Templeton in Mr. Turner's Herbarium, proves that he was the first discoverer of this most extraordinary species. It has also been gathered on the Sussex coast by Mr. Borrer, and it is through his assistance that I am enabled to offer the following observations respecting it. It grows in close tufts four or five inches long; the color of my dried specimens is light green, but in the place of growth it is probably different, as Mr. Borrer in those which he picked up on the beach at Brighton observed a purple tinge, and was thereby led to suspect that they had suf-

ferred some change in this respect. It is irregularly and repeatedly divided with branches, which are mostly opposite, but often alternate and not unfrequently crowded together. The ultimate ramuli are very long. What to the naked eye appears to be a single filament, under the higher powers of the microscope, is seen to consist of many agglutinated, or adhering closely together in the same manner as those of *C. fetida*, with which I apprehend this species possesses considerable affinity. Each individual of these extremely slender filaments is separately jointed. The length of the joints is about equal to their diameter, and so far as I am able to judge from a dried specimen, they each include a globule, of the same nature with those of *C. fetida*. The sketch at Plate F (made by Mr. Hooker from a dried specimen magnified 4 and 2) will serve to convey some idea of the plant, but I apprehend that it suffers more than most other species in drying, and it is principally from the observations of Mr. Borrer that this description has been made.

116. *nana*. *C. filis ramosis, minutissimis, fusco viridibus; ramis ramulisque sub alternis acuminatis; articulis diametro duplo longioribus. T. 30.*
117. *minutissima*. *C. filis sub-ramosis, minutissimis, hyalinis; ramis sparsis, furcatis, obtusifusculis; dissepimentis obsoletis; articulis longitudine variabilibus. T. F.*

On Confervæ in the Sea.

This species, which has been observed both by Mr. Borrer and myself growing parasitically on several of the Marine Confervæ, is so extremely minute as to be nearly imperceptible to the naked eye, and even the highest power of my microscope is hardly sufficient to ascertain its nature. The filaments are sometimes simple, but have most usually two or three branches which are frequently forked. Dissepiments may now and then be faintly distinguished at uncertain distances from each other, but with this exception no mark of internal organization or even color can be observed. For the drawing at Plate F, which represents the plant magnified 2 and 1, I am indebted to Mr. Woods.

118. *lanuginosa*. *C. filis sub-ramosis, minutissimis, ferrugineis; ramis sparsis, obtusiusculis; articulis medio pellucidis, diametro triplo longioribus.* T. 45.
- 119.* *pluma*. *C. filis repentibus, ramosis, minutis, intensè roseis; ramis erectis infra denudatis, supernè pinnatis pinnis oppositis, approximatis; articulis diametro duplo longioribus.* T. F.

On the stalks of *Fucus digitatus* in Bantry Bay. *Miss Hutchins.*

This beautiful species, of which a drawing and specimens were communicated by Miss Hutchins to Mr. Turner, may be readily distinguished from *C. repens* and *C. tenella*, to which it is most nearly allied, by having the erect branches thickly pinnated with opposite ramuli towards their apices. The capsules are globose and mostly terminal. The drawing at Plate F, for which I am indebted to Mr. Hooker, represents *C. pluma* of the natural size, and also when magnified 1.

120. *repens*. *C. filis repentibus, ramosis, implexis, minutis rufis; ramis erectis; ramulis sub secundis obtusis; articulis diametro triplo longioribus.* T. 18.

My former reference to Dillenius is erroneous, as has been pointed out by Mr. Turner in his remarks on the Dillenian Herbarium, *Lin. Transf.* VII. p. 106.

121. *tenella*. *C. filis repentibus, ramosis, implexis, minutis dilutè roseis; ramis erectis, simplicibus; articulis longitudine variabilibus.* T. F.

On the Shells of the large Scallop at Bantry. *Miss Hutchins.*

The present is one of the numerous species for the discovery of which the botanical world is indebted to Miss Hutchins. The filaments are of the same size and strike root precisely in the same manner as those of *C. repens*, from which it differs in its lighter color, extremely flaccid nature, more slender growth, and in having the erect branches undivided. The drawing at Plate F was made by Mr. Hooker from a dried specimen, and represents *C. tenella* both of the natural size and when magnified 1.

- 122.* *Daviesii*. *C. filis ramosis, erectis minutis, liberis roseis; ramis sparsis acuminatis; articulis diametro triplo longioribus.* T. F.

On Marine Algae; *Rev. Hugh Davies*. Bantry Bay; *Miss Hutchins*. At Brighton; *Mr Borrer*.

I have a pleasure in naming this species after my valuable friend, the Rev. Hugh Davies, whose intimate knowledge of many branches of Natural History is well known, and to whose liberality this work is greatly indebted. Its length rarely exceeds three or four lines, and it may be distinguished from its congeners by its unentangled growth, and far different ramification. Mr. Borrer informs me that he has once discovered it with capsules, placed in rows along the upper side of the ramuli. For the drawing at Plate E. I am indebted to Mr. Hooker; it represents the plant magnified 3, and a piece of the filament magnified 1.

123. *Rothii*. *C. filis dichotomo-ramosis, erectis, brevibus, densè cæspitosis, phœniciis; ramis ramulisque alternis; articulis diametro sub-triplo longioribus.* T. 73.

Several years ago I received a specimen of this plant from Mr. Robert Brown, gathered by himself in the North of Ireland, and which he had named *C. phœnicia*. It was not till after I had published my description of *C. Rothii* that I recognised it as the same species, which I much regret, as Mr. Brown certainly first discovered it in Britain. It has since been found by Mr. W. W. Young, near Dunraven, in Glamorganshire, and by Messrs. Hooker and Borrer, on the Coast of Durness, Sutherland.

- 124.* *floridula*. *C. filis ramosis, tenuibus, cæspitosis, implexis, dilutissimè roseis; ramis sparsis, simpliciusculis, remotis; articulis diametro sub-triplo longioribus.* T. F.

Rocks on the Sea shore. On the Galway Coast; *Dr. Scott*. On the Antrim Coast; *Mr. Mackay*.

I received specimens of this species from the late Dr. Scott, gathered on the Galway coast, where it covers the rocks on the Sea shore. The fila-

ments are much finer than human hair, but their growth is so entangled, that in a dried specimen it is almost impossible to separate them so as to ascertain their length, which I believe generally about half an inch; when fresh, according to Mr. Mackay's observations, they are of a fine bloom color, but this they lose in drying and then become of a reddish dull green. The sketch at Plate F was made by Mr. Hooker from a dried specimen, and represents the filament magnified 3 and 1.

- 125.* *interrupta*. C. filis ramosis, breviusculis, purpurascentibus; ramis ramulisque alternis; articulis sursum incrassatis, truncatis, diametro sub-quadruplo longioribus.

C. interrupta. Eng. Bot. t. 1838.

On Marine Confervæ. At Brighton; Mr. Borrer. In Bantry Bay; Miss Hutchins.

The capsules of this species are divided in a remarkable manner by a transverse pellucid line.

126. *pedicellata*. C. filis dichotomo-ramosis rubris; ramulis alternis multifidis; articulis sursum incrassatis, diametro sub-quintuplo longioribus. T. 108.

127. *setacea*. C. filis dichotomo-ramosis, virgatis, strictis, intense splendideque roseis; ramis elongatis; articulis sub cylindraceis diametro sub quintuplo longioribus. T. 82.

128. *corallina*. C. filis dichotomis, lubricis, splendide aureo-rubris; articulis sursum incrassatis, diametro quadruplo longioribus. T. 98.

Since I published my description of *C. corallina* I have not seen any recent specimens, but I have examined many in a dried state, and these have led me more and more to suspect that my drawing, as well as former observations respecting the fructification of this species, are in at least some degree inaccurate. It is impossible to form any decided opinion from dried specimens, but I am inclined to believe that the involucre, till the seeds have arrived at maturity, so closely and compactly envelop the internal

jelly, as to bear the resemblance as well as answer the purpose of a capsule. In some specimens I have seen a still stronger resemblance of capsules, than what I have figured at D, but they were of a smaller size, and had evidently not arrived at maturity, which having attained, they would I apprehend by an expansion of the involucrum, have appeared as is represented in English Botany, with their internal jelly exposed without any covering.

- 129.* *barbata*. C. filis dichotomo-ramosis, lætè sanguineis, apice fibrosis; fibris multifidis tenuissimis; articulis sursum incrassatis, diametro quintuplo longioribus.

C. barbata. Eng. Bot. t. 1814.

On the Beach at Brighton. Mr. Borrer.

The seeds of this species are imbedded in naked jelly, and guarded by an involucrum instead of a capsule.

- 130.* *multifida*. C. filis ramosis, rubris; ramulis sub-ternatis, distantibus, brevibus, multifidis; articulis diametro multiplo longioribus.

C. multifida. Eng. Bot. t. 1816. (excl. Syn.)

In the Sea. On the Devonshire Coast; Mrs. Griffiths. On the Beach at Brighton, and near Newhaven; Mr. Borrer. In Bantry Bay; Miss Hutchins.

Dr. Smith erroneously supposed this species to be Hudson's *C. multifida*, forgetting that as well as *C. imbricata* it had been before proved to be *C. equisetifolia* of Lightfoot. As however *multifida* has never been used as a name for *C. equisetifolia*, there cannot I apprehend be any objection to its being retained for the present species. Mr. Borrer informs me that he has discovered a fructification on this species, differing from the one represented in English Botany, and of the same nature with that of *C. barbata*.

131. *equisetifolia*. C. filis ramosissimis, crassis, rubris; ramis utrinque attenuatis, ramulis verticillatis, imbricatis, brevibus, multifidis, undique obsessis; articulis diametro multiplo longioribus. T. 54.

The Rev. G. R. Leathes discovered the fructification of this species in a

specimen which he gathered in August, 1807, on the beach at Yarmouth. It is of the same nature with that of *C. barbata*, consisting of seeds immersed in a pellucid jelly, and surrounded by numerous filaments which wholly envelop it. It is scattered over the sides of the branches, and has to the naked eye the appearance of being only very young shoots.

132. *verticillata*. C. filis dichotomo-ramosis, cartilagineis, crassis, fusco-olivaceis; ramulis verticillatis, incurvis, brevissimis, plerumque bifurcis, undique obfessis; articulis diametro brevioribus. T. 55.
133. *spongiosa*. C. filis ramosis, cartilagineis, crassis, olivaceis, ramulis simplicibus, brevissimis, undique imbricatis; articulis diametro sub-fesquilongioribus. T. 42.
134. *villosa*.† C. filis ramosis, flaccidis, crassis, elongatis, flavis; ramis oppositis, remotis, ramulis minutis, pinnatis, sub-verticillatis, undique obfessis; articulis diametro dimidio brevioribus. T. 37. and T. F.

In September, 1808, the Rev. G. R. Leathes found a specimen on the Yarmouth Beach, on which Mr. Turner has favored me with the following remarks. "The fibres grow as described in the *British Conserve*, from every 3d, 4th, or 5th dissepiment, but rather in tufts than in whirls: they are long, sometimes simple, but mostly three or four times dichotomous, with acute angles; towards their bases grow on them short oblong dark-brown bodies (whether seeds or capsules it is impossible from their minuteness to determine) clustered and sessile, but from the collapsing of the juices, often looking pedunculate. The filaments are so obsoletely jointed that it is difficult to say, if they are so in reality or not, though they look

† I have received specimens of *Fucus aculeatus* and *Fucus ligulatus* from Mr. Backhouse, which are covered with short ramuli of the same nature and appearance with those of *C. villosa*. In the former I found to my great surprize that the aculei are regularly jointed, and that the main filaments, especially towards their extremities, have a similarly jointed internal tube running longitudinally through them, and occupying nearly half of their width. I was particularly struck with the resemblance of the joints to those of *C. villosa*, and they fully confirm Mr. Turner's opinion, that there is a strong affinity between these two plants.

so in drying." In dried specimens these bodies hardly appear to belong to the fructification at all. For the drawing at Plate F, which represents the supposed fructification highly magnified, I am indebted to Mr. Leathes.

135. *fluviatilis*. C. filis ramosissimis, cartilagineis, olivaceis; ramis ramulisque utrinque attenuatis; dissepimentis verrucosis; articulis utrinque dilatatis, diametro subquintuplo longioribus. T. 29.

For the fructification of this species see Introduction, p. 20.

136. **torulosa*. C. filis sub-simplicibus, nodosis, cartilagineis, basi attenuatis, apice sub incrassatis, olivaceis; articulis utrinque contractis, diametro sub triplo longioribus. T. F.

C. torulosa. MOHR in Schrader's *Journal* for 1801, p. 324. t. 3. f. 1. 2.

ROTH. *Cat. Bot.* III. p. 250. *Fl. Germ.* III. pars 1. p. 529.

C. fluviatis nodosa, *Fucum æmulans*. DILL. *Hist. Musc.* p. 39. t. 7. f. 48.

In Mountain Streams. Near Ludlow; *Dillenius*. *Anglesea*; *Rev. H. Davies*.

I am still somewhat doubtful whether this species should be considered as distinct from *C. fluviatilis*, but I have nevertheless admitted it here as such, in respect to the opinion of the late Dr. Mohr and Dr. Roth, the former of whom in the German translation of this work, says, that he has seen the two plants growing together, and is convinced they are perfectly distinct, to which I have thought it right to accede, never having myself enjoyed an equally favorable opportunity for the examination of them. The fructification is similar to that of *C. fluviatilis*. For the drawing at Plate F, I am indebted to Mr. Hooker, in which the joints are represented magnified 5, with a transverse section of the filament to shew the seeds magnified 2, and also the seeds separated and magnified 1.

137. *ciliata*. C. filis dichotomis, apice forcipatis rubris; dissepimentis verticillatim ciliatis; articulis medio pellucidis, diametro longitudinem vix superantibus. T. 53.

138. *diaphana*. *C. filis ramosissimis apice forcipatis, purpurascentibus; dif-*
sepimentis obsoletis; articulis utrinque torosis, medio pellucidis, diametro
sub longioribus. T. 38.
139. *rubra*. *C. filis ramosissimis rubris; ramulis fetaceis, apice furcatis;*
articulis utrinque attenuatis, centrum versus pellucidis, diametrum longi-
tudine sub æquantibus. T. 34.

In Mr. Turner's Herbarium there are bleached specimens of a light straw color, gathered by Mrs. Griffith at Sidmouth, which differ so much from the common appearance of *C. rubra*, as to have induced both these Botanists to regard them as belonging to a separate species. They are scarcely two inches long, and comparatively thin: their substance is remarkably thick and cartilaginous, but the leading difference is in the joints, each of which is marked in the center with a dark globular spot, nearly similar to those which may be often seen in *C. polymorpha*. The fructification consists of seeds scattered through the interior of the ultimate ramuli, but these can by no means be considered as an indication of specific difference, since they have been also observed in many of the other capsuliferous *Confervæ*. This remarkable appearance of *C. rubra* is represented at Plate F, magnified 5 and 3, from a sketch with which Mr. Hooker favored me.

140. *tetragona*. *C. filis ramosissimis rubris; ramulis patento-horizontalibus,*
basi attenuatis, apice acuminatis, fasciculatis, brevibus; articulis ovato-cylin-
draceis, diametro duplo longioribus. T. 65.
141. *tetrica*. *C. filis decomposito-pinnatis, fusco-rubris, luridis; pinnis pin-*
nulisque alternis, extremis curvatis; articulis diametro sub-triplo longiori-
bus; capsulis solitariis, pedunculatis. T. 81.

Since the publication of this species it has been found abundantly in Bantry Bay, by Miss Hutchins, and on the Devonshire coast by Mr. Griffiths and Miss Hill.

142. *rosea*. C. filis decomposito-pinnatis, tenuibus, roseis; pinnis pinnulisque alternis; articulis diametro sub-triplo longioribus; capfulis fecundis sessilibus. T. 17.

Dr. Roth considers the plant which I have figured to be a variety of *Ceramium roseum*. Mr. Turner and Mr. Borrer are of opinion that the plant which grows in the Yare, and which is that figured in *English Botany* is a distinct species, but I apprehend that every difference between them, entirely arises from the growth of the former in the sea, and of the latter in a river, where the water at some states of the tide, of course contains a much less quantity of salt.

- 143.* *Borreri*. C. filis decomposito-pinnatis, tenuibus, roseis; pinnis pinnulisque alternis, flexuosis, ultimis fastigiatis; articulis diametro sub-duplo longioribus.

C. Borreri. Eng. Bot. t. 1741.

Among the rejectment of the Sea at Yarmouth. Mr. Borrer.

I have never seen any other than a dried specimen of this plant, and it is therefore perhaps that I am inclined to doubt, whether it ought to be considered as more than a variety of *C. rosea*, which is a very variable species.

144. *Turneri*. C. filis pinnatis, roseis; pinnis oppositis, sub simplicibus; articulis diametro triplo longioribus. T.

145. *plumula* C. filis ramosis roseis; ramis alternis pinnatis; pinnis oppositis, horizontaliter recurvis; pinnulis fecundis; articulis diametro sub triplo longioribus. - T. 50.

C. Turneri. Eng. Bot. t. 1637.

- 146.* *Mertenсии*. C. filis ramosis, flavescentibus; ramis pinnatis; pinnis sub-oppositis brevibus; articulis diametro dimidio brevioribus.

C. Mertenсии. Eng. Bot. t. 999.

On the Beach at Yarmouth; Mr. Wigg. In Bantry Bay; Miss Hutchins. Coast of Durham; Mr. Backhouse.

147.* *Hookeri*. C. filis ramosissimis, primariis incrassatis inarticulatisque, pallidè rufo fuscescentibus; ramulis confertis, abbreviatis, pinnatis, pinnulis alternis articulatis; articulis diametro sesquolongioribus. T. 106.

148.* *arbutula*. C. filis primariis incrassatis, inarticulatis, infernè denudatis, supernè ramosissimis, rubris; ramulis confertis, sub verticillatis, abbreviatis, multifidis, articulatis; articulis longitudine diametrum æquantibus. T. 85. & T. G.

Since I published my description of this species, it has been found on the shores of Caithness and Orkney by Mr. Borrer and Mr. Hooker. Two kinds of fructification produced by this species, from a drawing by Mr. Hooker, are represented in Plate G magnified 1.

149. *coccinea*. C. filis ramosissimis, primariis incrassatis, hirsutis, inarticulatisque, coccineis; ramis alternatim decomposito-pinnatis; pinnulis ultimis multifido-fasciculatis, articulatis; articulis diametro sub brevioribus. T. 36. & T. G.

β. tenuior. Filis tenuioribus.

The variety *β* has been sent to Mr. Turner from the southern coasts by Mrs. Griffiths, and also from Ireland by Mr. Templeton and Miss Hutchins. Its size is more slender than that of *α*, and its ramuli shorter, and less feathery. The most remarkable difference however lies in the capsules, which instead of being ovate, are lanceolate, and produce two rows of small globular seeds; they are sessile at the axillæ of the ramuli. The seeds of the ovate capsules, which in my T. 36 are represented globular, should, according to Mr. Turner's observations, have been made pyriform. The lanceolate capsules of the variety *B* are represented in my plate F, from a highly magnified drawing by Mr. Hooker.

b. *longitudinaliter venosæ*.

150. *elongata*. C. filis ramosissimis, cartilagineis, crassis, reticulato-venosis, purpureis; ramis ramulisque elongatis, diffusis; articulis diametro dimidio brevioribus. T. 33.

Besides the fructification represented in T. 33; the minute lanceolate capsules alluded to in the description, are also represented in the supplementary plate F, from a sketch by Mr. Hooker. These pod-like processes, in which the supposed seeds are lodged, at length grow into branches.

- 151. *fusca*. C. filis ramosis, venosis, fuscis; ramis distantibus, sub-alternis; ramulis patentibus clavatis; articulis medio transversim fasciatis, diametro duplo longioribus. T. 95.
- 152. *polymorpha*. C. filis dichotomis, venosis, fastigiatis, cartilagineis, atropurpurascens; articulis centro punctatis, diametro sub-brevioribus. T. 44.
- 153.* *Brodiaei*. C. filis ramosissimis, venosis, purpureo-nigrescentibus; ramis elongatis; ramulis sparsis, patentibus, multifidis, fasciculatis; articulis ramorum obsoletis, ramulorum diametro sub-longioribus. T.
- 154. *fucoides*. C. filis ramosissimis, venosis, diffusis, subcartilagineis; fusconigris; ramulis horizontaliter patentibus, dichotomis, ultimis incurvis, acuminatisque; articulis diametro sub-fesquilongioribus. T. 75.
- 155. *nigrescens*. C. filis ramosissimis, venosis, strictis, sub cartilagineis, fusconigris; ramulis erectis dichotomis acuminatis; articulis diametro sub-fesquilongioribus.

C. nigrescens. Eng. Bot. t. 1717. (exc. syn.)

On the Beach at Yarmouth; Mr. Turner. Coast of Devonshire; Mrs. Griffiths. Brighton; Mr. Borrer.

I have been induced here to admit this species under the name of *C. nigrescens* in opposition to the opinion of Sir Thomas Frankland, who has sent me the following plant by that name, because I find that this is the plant so called by most Botanists, and even as Mr. Turner assures me, by some who were well acquainted with Hudson. It so strikingly resembles *C. fucoides* in the size and color of the filaments, that it is not without some hesitation that I publish it as a separate species, but Mr. Turner who has repeatedly examined recent specimens of the two plants together, is de-

cidedly of opinion that they are perfectly distinct. It differs in having its main filament of far greater thickness than the rest, and the whole of its branches remarkably straight and erect, while the habit of the other is particularly bushy. The outline too of the two species is very dissimilar, that of *C. fucoides* being nearly orbicular, but that of *C. nigrescens* narrowly cuneiform.

156.* *urceolata*. *C. filis ramosissimis, venosis, diffusis, rufo-fuscis; ramulis patentibus, brevibus; articulis caulis longis, ramulorum brevioribus.* T.G.

C. nigrescens. Fl. Ang. p. 602?

On Rocks and the larger Fuci in the Sea. On stems of *F. digitatus*, and on Rocks opposite the Bathing-house at Scarbro'; Sir T. Frankland. On stems of *F. digitatus* in the Isle of Wight; Mr. Turner and Mr. Borrer. Also on the same Fucus on the Beach at Brighton; Mr. Borrer. Near Forres; Mr. Brodie. Devonshire Coast; Miss Hill.

For specimens of this plant I have to express my obligations to Sir Thomas Frankland; who, as mentioned under the preceding species, sent it to me by the name of *C. nigrescens* of Hudson. Mr. Turner informs me that he has seen it in some Herbaria marked by Mr. Lightfoot, "*C. urceolata*, M. S." an appellation peculiarly appropriate, as the capsules differ in their shape from those of every other Conferva, and approach, especially when dried, those of *Splachnum urceolatum* or *ampullaceum*. It most commonly grows parasitically on the larger Fuci, and as remarked by Miss Hill, looks then at first sight like red wool. Its color in that state is a fine rich brown red, which would hardly be supposed from the dull black that it assumes in drying. The veins or tubes which compose the filament are fewer than those of *C. fucoides* and bear more resemblance to those of *C. stricta*. The joints towards the root are long, but become gradually shorter as they approach the ultimate ramuli, in which their length scarcely exceeds the diameter. The drawing at Plate G was made by Mr. Hooker from a

specimen which had been dried, and represents the end of a filament magnified 4, and also separately the upper and lower joints magnified 1.

- 157.* *patens*. *C. filis ramosis, venosis, sub-diffusis, roseis; ramis ramulisque sparsis, patentiusculis; articulis diametro sub-duplo longioribus.*

On *Fucus digitatus*, in the Sea, near Bantry; *Miss Hutchins.* At Seaton, Devon; *Mrs. Griffiths.*

This species, for a specimen of which I am indebted to Mr. Turner, is nearly allied to *C. stricta*, but the habit of the two plants is very different. It is of about the same size, but may be distinguished by its more diffuse growth, by its different ramification, and numerous short lateral ramuli. The length of the joints in both species is subject to some variation, but those of *C. patens* are comparatively shorter. Many of the ultimate ramuli in the specimen now before me are swollen, and in these red globules may be observed, similar to those which in several of the other marine algæ are called feeds; but with all due deference to the opinion of my friend Mr. Turner, I must confess that I still feel myself very doubtful of their real nature. The sketch at Plate G was made from a dried specimen by Mr. Hooker, and represents different parts of *C. patens* magnified with powers 5, 3, and 1 of his microscope.

158. *stricta*. *C. filis ramosis, venosis, strictis, fastigiatis, tenuibus, phœniciis; ramis dichotomis erectiusculis; articulis diametro sub-triplo longioribus.*
T. 40.

β. diffusa. *Filis diffusis.*

The plant which I have here arranged as a variety of *C. stricta*, was gathered in the neighbourhood of Bantry by Miss Hutchins, and in her opinion is a distinct species. There is indeed at first sight a striking difference between them, but this gradually vanishes when the two plants are compared. It differs in its mode of growth, which is much more bushy, and in its general outline, which is more orbicular. The common appearance of *C. stricta* retains its glossy red when dried, but the color of this variety then

turns to a dull dirty brown. In their structure when examined with a microscope they however exactly agree, as well as in the fruit, which has been discovered in the former subsequently to its publication in this work, and consists of small ovate dark red capsules, sessile, or nearly so on the upper branches.

- 159.* *fibrata*. C. filis ramosis, venosis, rubicundis; ramis dichotomis; ramulis sub-fasciculatis, apice fibris pellucidis obsessis; articulis caulibus longis, ramulorum diametrum longitudine æquantibus. T. G.

On Marine Algæ, near Forres; *Mr. Brodie*. At Cawfie, Murrayshire; *Mr. Hooker* and *Mr. Borrer*.

The filaments, which grow to the length of about two inches, are branched with repeated dichotomies, and strongly marked with longitudinal veins. Their summits are fringed with numerous, long, extremely slender, dichotomous, transparent fibres, of which from their extreme tenuity, it is almost impossible, especially in a dried specimen, to ascertain the structure, but they, I think undoubtedly are of the same nature with those of *C. barbata*. Besides an appearance of capsules in the dried specimens now before me, I also observe several masses of loose jelly, imbedding numerous pyriform seeds, and surrounded by a few short segments resembling an involucre. I at first supposed that the fructification is nearly of the same nature with that of *C. corallina*, and that the appearance of capsules is occasioned by the involucre being compactly closed over the jelly to protect the yet unripe seeds, but Mr. Borrer says, "When I examined it fresh with Mr. Hooker, at Brodie, we saw the capsules as we thought them, splitting at the apex (I think into four segments) but it never struck me that they were any thing analogous to the involucre of *C. Corallina*." In another specimen now before me there are no capsules, but many of the joints are swollen, and each of these includes a dark colored globule, similar to those observable in many other *Conservæ*. At

Plate G, from a sketch by Mr. Hooker, a branch of *C. fibrata* is represented magnified 3, and also the joints of the stem magnified 2.

- 160.* *denudata*. *C. filis ramosissimis, venosis, diffusis, fusciscentibus; ramis sparsis, divaricatis, elongatis, remotis; articulis diametro sub-fesquilongioribus.* T. G.

In the Sea at Southampton; *Mifs Biddulph*.

Mr. Borrer favored me with specimens of this species, which he received from Mr. Sowerby, but they are so imperfect at the apices, that without his assistance I should not have ventured to publish it. The color is brown, and Mr. Borrer's largest specimen is about four inches in length. The filaments are repeatedly branched: the branches issue almost at right angles and are placed without order, but usually at considerable distances from each other, and Mr. Borrer in a letter says, "Mr. Sowerby told me that the points of all the ramuli were very long and slender when the specimens were recent, and fell off when they were put into fresh water." The length of the joints is nearly the same throughout the plant, and is about half greater than the diameter. The capsules have not been discovered. I am indebted to Mr. Woods for the sketch at Plate G, which represents the ramification of the natural size, and the joints when magnified 3.

- 161.* *badia*. *C. filis ramosis, venosis, strictis, rubro-nigrescentibus; ramis elongatis; ramulis abbreviatis, remotis, sub-simplicibus; articulis diametro fesquilongioribus.* T. G.

On the Beach at Hastings; *W. Borrer, junr. Esq.*

Mr. Borrer who has examined this plant whilst recent, considers it as a distinct species, and so far as can be judged from a dried and somewhat imperfect specimen, I entirely coincide with his opinion. He thinks that it is intermediate between *C. nigra* and *C. urceolata*, from both of which among other things it may be at once distinguished by its joints, which are nearly of the same length in every part of the filament, and in that respect approaches more to *C. fucoides*. For the sketch in Plate G, I am indebted



to Mr. Woods; it represents a filament of the natural size, and also the joints of the stem and a ramulus magnified 3.

162. *nigra*. C. filis ramosis, venosis, rubro-nigrescentibus; ramis elongatis; ramulis abbreviatis, remotis, multifidis, sub-penicilliformibus; articulis caulis longis, ramulorum triplo brevioribus.

C. nigra. Fl. Ang. p. 595. WITHERING. IV. p. 131.

C. atro-rubescens. T. 70.

It is already mentioned in the Introduction that the species which I published with the name of *atro-rubescens* is Hudson's *C. nigra*.

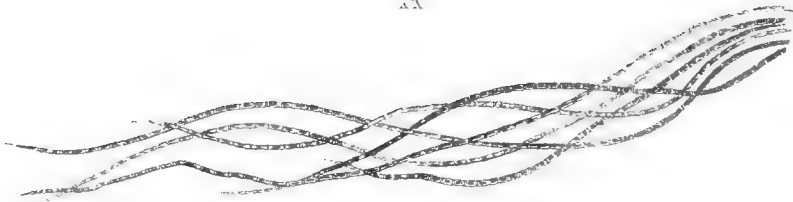
- 163.* *fibrillosa*. C. filis ramosissimis, venosis, rubris; ramis ramulisque sparsis, ultimis brevibus, multifidis, apicibus protensis, fibrilliformibus; articulis inferioribus longis, summis abbreviatis. T. G.

In the Sea. On the Beach at Brighton and Shoreham; *Mr. Borrer*. At Seaton; *Mrs. Griffiths*. Bantry Bay; *Miss Hutchins*.

The nearest affinity of this species is with *C. byssoides*, from which it may however be readily distinguished by its more diffuse and irregular ramifications. The ultimate ramuli are tufted as in that species, but they are less numerous, by far more slender, and more repeatedly dichotomous. Mr. Borrer who has attentively studied this plant whilst fresh from its place of growth, in which state alone these slender ultimate ramuli can be examined with much advantage, informs me, "that they are not composed, like the other parts of the plant, of several parallel tubes, but are simply tubular, and spuriously jointed (*utriculis maritabilibus*), the length of the joints many times exceeding the diameter." Mr. Borrer also says, but which I have not myself observed, that similar fibres occasionally occur in other species of this section which are usually without them, and therefore queries whether they may not possibly be a parasitical production. The capsules resemble those of *C. byssoides*, except that they are mostly raised on short fruit stalks. For the sketch of this species at plate G, I am indebted to Mr. Hooker; it represents a branch magnified 4, and also the joints of the lower part of the filament magnified 3.

164. *lyfides*. *C. filis decomposito-pinnatis, venosis, flaccidis, rubris; pinnis pinnulisque alternis, ultimis perbrevibus, multifidis, penicilliformibus; articulis inferioribus longis, summis abbreviatis.* T. 58.
165. * *parafstica*. *C. filis bipinnatis, venosis, rigidiusculis, fusco-rubris; pinnis pinnulisque alternis; articulis diametro sub-brevioribus.*
C. parafstica. Fl. Ang. t. 604. WITH. IV. p. 142. Eng. Bot. t. 1429.
 On Fuci. Coast of Yorkshire, Cornwall, and Dorsetshire; *Hudſon*.
 At Scarboro'; *Sir T. Frankland, Bart.* Bantry Bay; *Miss Hutchins.*
166. *pennata*. *C. filis pinnatis, venosis, rigidiusculis, olivaceis; pinnis suboppositis elongatis, approximatis, strictis, spinæformibus; articulis longitudine diametrum sub-æquantibus.* T. 86.
 Mr. Borrer has gathered at Beachy Head an unusually large variety of this species, with oblong pedicellated capſules.
167. *ſcoparia*. *C. filis ramosis, venosis, rigidis, olivaceis; ramis alternis, subbipinnatis, confertis; pinnulis, brevibus, alternis, acuminatis; articulis longitudine diametrum sub-æquantibus.* T. 52.

A



B



Conjuncta erectorum.

CONFERVA ERICETORUM.

C. filamentis simplicibus tenuibus, densissime implexis: dissepimentis paulum contractis, articulis longiusculis.

C. ericetorum. Roth Fl. Germanica III. p. 507. Cat. Bot. II. p. 206.

On moist Heaths about London and Yarmouth, &c.

THE learned and indefatigable Dr. Roth, of Vegesack, near Bremen, was the first botanist who ever described this beautiful little Conferva, which he published in his valuable Flora Germanica, and Cataloga Botanica; two works to which I shall have frequent occasion to refer in the course of the present undertaking.—My friend D. Turner added it to the British Flora, having found it growing abundantly on the bare parts of turfy heaths near Yarmouth, and compared it with specimens sent him by its first discoverer.

Its extremely slender simple filaments, of a dull purple colour, from half an inch to an inch in length, grow matted together in such a manner that they form a dense coat on the surface of the ground; and from their adhering so closely to it, as well as from the similarity of their tint, are hardly distinguishable from the soil itself, except by one much in the habit of observing these plants. This is most probably the reason why it so long escaped notice, for it is common on all the moist heaths I have examined, and I cannot doubt its being equally abundant in similar places throughout England. Some other species of Conferva delight in such situations; but from these, the colour of the present plant is quite sufficient to distinguish it. In Dr. Roth's figure above referred to, the interior substance is represented as having divided and collapsed towards each dissepiment, whereas in all the specimens which I have examined, the contrary has occurred; and, as in many other Confervæ, it has formed an opaque cylinder in the middle of each joint.

A. Filaments magnified 3.

B. Piece of ditto magnified 1.

B



Conferva cyamulata

CONFERVA BIPUNCTATA.

C. filamentis simplicibus lutescentibus lubricis, articulis brevibus cylindricis, bipunctatis.

C. bipunctata. Roth Cat. Bot. II. p. 204.

C. stellina. Muller in Nova Acta. Pet. III.

In Pools and Ditches; about London and Yarmouth, frequent.

THERE is reason to believe that this species, though not hitherto described by any British author, is sufficiently common, particularly in the stagnant pools on heaths, either floating in thick masses on the surface, or loose and straggling at the bottom of the water. The first specimens I received of it, gathered in Britain, were from my friend D. Turner; whose success in his researches into almost every branch of Cryptogamia is too well known to need repetition here. Muller, who described and figured it as above quoted, seems to be the earliest author by whom it was noticed; though, from his work being incorporated in the transactions of the Petersburg society, the plant was but little known to botanists till published by Dr. Roth as a new species in the 2nd vol. of his *Catalecta Botanica*. I have adopted the name assigned to it by the latter botanist, not only on the score of its superior excellence, but also, because the appellation given to it by Muller is apt to mislead; being applicable only in a state verging upon decay. The dots then assume a stellated appearance, as shown in the shorter filament of the figure A. in which the plant appears but slightly magnified. From *C. spiralis* it may generally be known by its larger size, more yellow and less glossy hue; from *C. genuflexa* I believe always by the former of these circumstances, as well as by its being destitute of the broken appearance, which is a striking characteristic of that plant. It is however difficult to distinguish these species with certainty, unassisted by a microscope; though with its aid, this may be immediately recognised by the shortness of its joints, and by their containing each two dark spots,

frequently furnished with a green longitudinal streak running through them.— The form of these spots is in general almost elliptical, but sometimes tends to globular; and, as above mentioned, they take in their latter stage a singular stellated appearance: the space also that they occupy in the joints is far from certain, for sometimes they fill nearly the whole, and at others only a small portion of them.

Fig. D. represents what I suppose to be a variety of *C. bipunctata*, though it may possibly hereafter prove to be a distinct species; I found it abundant on Finchley Common, in March, 1802, in company with my friend J. Woods, jun. and both from its brown colour and the singular formation of its spots, it differed remarkably from the general appearance of the plant.

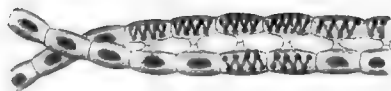
A. Filaments magnified 4.

B. & C. Ditto in different stages 1.

A



B



Conferia sporalis.

CONFERVA SPIRALIS.

C. filamentis simplicibus lubricis articulis cylindricis longiusculis, fructificationum granulis simpliciter spiralibus.

C. spiralis. Rot Cat. Bot. II. p. 202.

C. quinina. Muller in Acta. Nova. Pet. III.

In stagnant Ditches and Pools ; about London and Yarmouth, common.

IT is not without considerable hesitation that I have ventured upon introducing this *Conferva*, as specifically distinct from the following one, nor do I even now look upon the case as altogether certain, though I consider that the regarding them as different, in compliance with the opinions of Muller and Dr. Roth, is the most likely way to avoid future confusion.

C. spiralis is frequently found mixed with *C. nitida* and *C. bipunctata* ; from which it is to be distinguished by its much smaller size, and by the disposition of its granules in a single spiral tube, resembling, as is observed by Muller, a chain of Roman V's. That botanist appears to have been the first who described it in the excellent paper above quoted ; and of course I should have adopted his name, which, though quaint, is very expressive, had it not been more generally known by the equally applicable one of Dr. Roth. Not only in its nature, but also in its colour, its mode of growth, and the places which it inhabits, the affinity between this plant and *C. nitida* is very great ; as what is said of the joints and granules of that species is equally applicable to this, I refer my reader to the remarks there given, and shall add nothing farther respecting *C. spiralis*, except a curious circumstance mentioned in the *Catalecta Botanica* ; which is, that if the water in which it is put be strongly agitated, the granules lose their spiral form and become scattered without order through the joint. I have however repeated this experiment without success.

Since the description of *C. spiralis* was written, and indeed the whole fasciculus finished, I have had an opportunity of tracing its growth satisfactorily,* and of ascertaining that it is not *C. nitida* in a younger state; but was surprized to find that in the last stage of its existence, the filaments became connected in a manner precisely resembling *C. jugalis*, which strengthens the suspicion that that curious plant is not a distinct species, but only an appearance assumed by *C. nitida* in certain situations, or at certain periods of its growth; the same circumstance will probably be found in some other species of this singular tribe.

A. *C. spiralis* magnified 1.

B. Ditto anastomosing after the manner of *C. jugalis*, magnified 1.

* May 2d, I found *C. spiralis* growing abundantly in a pool near Yarmouth, in which I observed none when I examined it but a few days before; the filaments were then as represented in fig. 4.

May 6th, The plant occupied a larger space in the pool, but when magnified still appeared the same.

May 10th, The plant was of a more dull colour and had lost some of its lubricity, and when examined under a microscope, many of the filaments were seen connected, as represented in fig. B. they differed from *C. jugalis* only in the disposition of the seeds, being singly spiral in their smaller size, and in the oval masses not appearing so dense in those joints wherein the granules had collapsed.

May 13th, The whole was in a state of decay, but all the joints which still retained the spiral disposition of the granules, had that disposition only single; and though I examined a great number of filaments at each of the times above mentioned, I could not find one in which they were at all otherwise. This sudden appearance and disappearance of the *Conferva* had been before observed by my friend D. Turner; who, in the Introduction to his Synopsis, p. 19, observes, that often when he has known ditches filled with particular species, he has returned after a short time and found not even a vestige of them left.

A



Conspira nitida.

CONFERRA NITIDA.

C. filamentis simplicibus splendor lubricis, articulis longiusculis cylindricis fructificationum granulis duplicato-spiralibus.

C. nitida. Fl. Dan. Tab. 819.

C. rivularis. B. Fl. Ang. 591. Fl. Scot. p. 976. With. IV. p. 128.

C. palustris senica, crassior & varie extensa. Dill. Musc. 3. t. 2. f. 2.

Byssus palustris confervoides non ramosa viridis, filamentis crassioribus, fetas apri-nas æmulantibus. Mich. Gen. p. 210. t. 89. f. 6.

C. decimina. Muller in Nova Acta. Pet. III.

C. fetiformis. Roth Cat. Bot. Fasc. I. p. 171. II. p. 203.

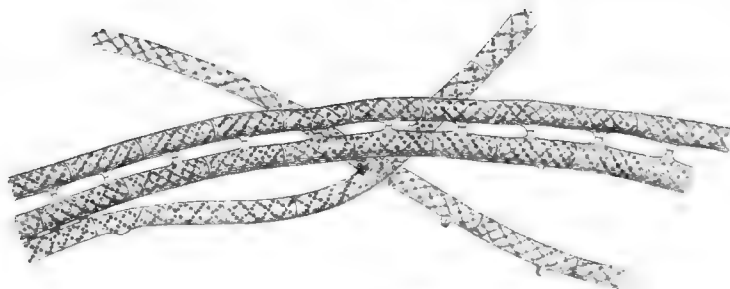
In Ditches and Pools; about London and Yarmouth, common.

THIS curious vegetable, which there is every reason to believe is not uncommon in ditches and stagnant waters throughout England, was near a century ago regarded as a distinct species by those botanists, who at that time directed their attention to this tribe; though from their imperfect acquaintance with the subject, they rested its claim to be considered as specifically distinct from *C. rivularis*, only upon its shorter thicker filaments, and the straggling mode of its growth: circumstances which, as the accurate Dillenius observed, might be occasioned by the dissimilar places which the two plants inhabit. Subsequent writers regarded them merely as varieties, till the present was figured in the Petersburg Transactions and the Flora Danica; and in the year 1797, Dr. Roth gave a complete account of it in the first volume of his *Catalecta Botanica*. It in general grows at the bottom of the water in loose irregular patches, not sufficiently matted to contain air bubbles, nor so much entangled as most of its congeners: its threads extend to a foot or more in length, and in thickness are about equal to the hair of the human head: its colour, when viewed in its place of growth, is so dark as often to appear almost

black; but in this respect is liable to considerable variation. From *C. rivularis* it may at once be distinguished, not only by its different mode of growth above noticed, but equally by its glossy hue and far greater lubricity; from *bipunctata* and *genuflexa* by its darker colour; and from all these, by its curious internal structure; in which respect however under the microscope it approaches nearly to *C. spiralis*, but differs in its larger size, and in its granules not being disposed in a single spiral tube; to *C. jugalis* it is still more nearly allied, but has a less flaccid appearance to the naked eye, and is easily distinguished when magnified, by its want of connecting processes. It would be a fortunate circumstance for the arrangement of this tribe, if more dependance could be placed on the relative proportions of the length and thickness of the joints; but it frequently happens that the former is twice or thrice, or even more, greater in some specimens than in others. This circumstance may account for the difference of the specific characters given to the present plant in the *Flora Danica*, and *Catalecta Botanica*; the former describing it 'articulis longis,' the latter, 'brevibus.' I have frequently seen filaments in the same specimens that agreed with either; but have, consistently with its most general appearance, adopted a term between these two extremes. Muller's description, which is otherwise both curious and accurate, is on this account not always applicable; he says that every joint contains four Roman X's, and thence derives the name that he has given it. The granules appear to be confined in spiral tubes, and vary considerably in size as well as in the distance of the tubes; being sometimes much crowded, and sometimes at a considerable distance from each other. In order to determine with more certainty than was otherwise possible the nature of these granules, my friend D. Turner and I placed some in a solar microscope, and found them perfectly pellucid, of a homogenous nature, with no appearance of their being filled by any granular substance; which confirmed, in some degree, an opinion before entertained, that these are not feed vessels, but the true fructification of the plant.

A.B.C. *C. nitida*. magnified 1.

A



B



Conjuncta jugalis.

CONFERVA JUGALIS.

C. filamentis simplicibus flaccidis, per paria sæpe conjugatis, fructificationum granulis duplicato spiralibus, in globulos demum congestis.

C. jugalis. Flora Danica. Tab. 883.

C. scalaris. Roth, Cat. Bot. II. p. 196.

Pools and Ditches; near Yarmouth, Halfeworth, and other Places in Suffolk.

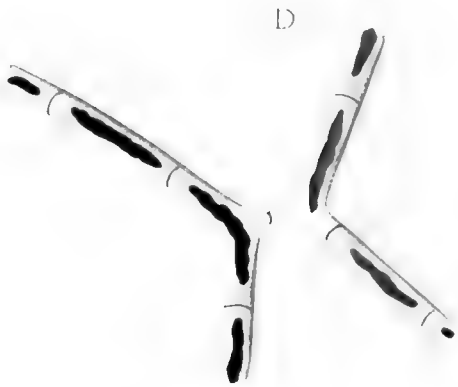
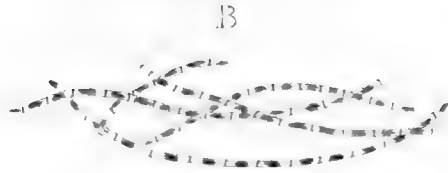
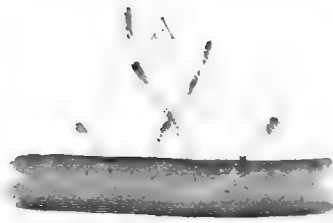
THIS plant, which in my opinion has a claim to be considered one of the most beautiful and interesting of its tribe, was first made known to the botanical world by Muller, who gave a characteristic figure of it in the Flora Danica, as above quoted: it was afterwards found by Dr. Roth in the Dukedom of Bremen, and was last spring added to the British Flora by my friend Dawson Turner, who detected it growing in shallow pools on Lound Heath, near Yarmouth; since which time we have together met with it in other places on the Northern part of Suffolk. What most strikingly distinguishes it at first sight is, its flaccid appearance rather resembling that of the narrow varieties of *Ulva compressa*, and the seemingly great size of its filaments, arising from their cohesion; by which, and their mode of growth, which is loosely entangled, the naked eye may distinguish it from *C. nitida*, wherewith, when magnified, it has a singularly strong resemblance; so much so, that it may be doubted whether it is more than a variety of that plant: it agrees with it in size, in the general length of its joints, though I have not observed them so variable in *C. jugalis* as in that species, and in the spiral disposition of its seeds; but differs in the latter collapsing from age into oval, or sometimes globular masses, and also in the connecting processes which form its most striking character. These are thrown out by many of the joints, and are extremely short tubes, by means whereof most of the filaments attach themselves to each other, and thereby receive a ladder-like appearance, whence Dr. Roth derived the excellent name of *scalaris*; which, however, as the plant was previously known by the equally appli-

cable term of jugalis, I have declined adopting. In this respect the present species approaches the nature of *C. genuflexa*; but the yellower colour, smaller size, and broken appearance of that species, are sufficient for the naked eye; and when magnified, its far different joints and mode of growth immediately distinguish it. Long filaments are often found wholly unconnected with the rest, and sometimes the uniting processes issue only from one or two joints. I feel myself perfectly unqualified to offer the slightest conjecture on the purposes which the wisdom of Providence has designed to answer by this singular union of the joints. Citizens Charles and Romain Coquebert, in a paper they communicated to the Philomatic Society of Paris, suppose that it is subservient to the fructification, stating it to be ‘the first instance in the vegetable kingdom of a reproduction absolutely analogous to that we find in animals;’* not only however may we observe granules in every respect similar in those joints which remain unconnected, but also in the filaments which sometimes occur, in which not even the rudiment of a single connecting process is discernible. There is much curious matter concerning this *Conferva* recorded in Dr. Roth’s *Catalecta Botanica*, which I cannot but regret that the limits of my present undertaking prevent my inserting; I must therefore refer my readers to that work for farther information.

A. *C. jugalis*, magnified 1.

B. Ditto, in a more advanced stage, 1.

* Philosophical Magazine, Vol. 3.



Carpenteria ginseng

CONFERVA GENUFLEXA.

C. filamentis simplicibus tenuissimis fragilibus hic illic genuflexis conjugatisque ; articulis longiusculis cylindricis, granulis in lineas coacervatis,

C. genuflexa. Roth, Cat. Bot. II. p. 199.

C. serpentina. Muller in Nov. Act. Ac. Scient. Imp. Petrop. III.

In Ditches and Pools ; about London and Yarmouth.

THE wonderful mode of growth, whence the preceeding species derives its name, is remarkable also (though in a far less degree) in the present, which is generally found floating in very thick masses on the surfaces of ditches and pools, and may be distinguished by its short filaments and pale yellow colour. When I first met with it in the vicinity of London, the threads were all simple, nor were there any symptoms of their having a tendency to anastomose, but their extreme brittleness seemed to be their most conspicuous character, as all of them had the appearance of being more or less broken. Hence I concluded it to be the *C. fragilis* of Dr. Roth's *Catalecta*, (II. p. 204.) and I still incline to this opinion; though, never having had an opportunity of examining any authentic specimens, I have not ventured on quoting that as a synonym. It was not till the middle of April that I met with this species in the ditches about Yarmouth, and discovered it to be the real *C. genuflexa*, by comparing it with specimens from Prof. Merteus, in the extensive herbarium of my friend D. Turner. The length of the filaments does not appear to exceed an inch or two, though, from their brittleness, it is impossible to form an accurate judgment on the subject: this mode of anastomosing is the same as has been already dwelt upon in the account of *C. jugalis*; but the connecting tubes are in general longer, and instead of issuing from almost every joint, they are placed at very uncertain distances, and the filaments are geniculate where they exist. *C. genuflexa* farther differs from *jugal*

in the threads not being regularly paired, but connecting themselves with any other that is near them; in this respect, manifesting a strong affinity to *C. reticulata*.

In Plaistow marshes I found a number of apparently seedling plants, of which I have added a sketch, growing on *C. rivularis*; they seemed to adhere by a callus, which is probably the case with the conferva in general. Among these vegetables we must consider the root as an organ of adhesion, not essential to the growth of the plant, as they continue to thrive when torn from it and floating on the surface of the water, nourished probably by absorbents, placed either in some particular part, or generally covering the frond.

- A. Seedlings of *C. genuflexa* growing on *C. rivularis*, magnified 3.
- B. Filaments more advanced, 3.
- C. Ditto anastomosing, 3.
- D. A small piece ditto, 1.

A



B



C



Conferva murata.

Pl. murata.

CONFERVA MURALIS.

C. filamentis simplicibus tenuissimis fasciatis rigidiusculis dissepimentis obsoletis; articulis brevissimis.

On moist Walls, Stones, Thatch, &c.

IT can hardly fail to strike even the most casual observer of plants, that the green masses observable on walls and stones in damp situations, must owe their origin to vegetable matter. *Ulva crispa* is known often to occasion them, but still more commonly do they proceed from the present plant; the minuteness of which is such, that its having hitherto escaped observation, is not wonderful, its filaments being so fine that the human eye can scarcely distinguish them; and it is only by the assistance of the highest powers of a compound microscope that we can form any just idea of their nature. Its mode of growth is very densely matted, adhering closely to the substance on which it grows, and insinuating itself into every crevice: it is composed of threads about an inch long, equal at each extremity, variously twisted, and rather rigid; at least so much so, that when immersed in water they do not follow the course of the current. Viewed with a good glass, the filaments are seen to be composed of extremely short joints, in general cylindrical, but sometimes assuming a globular appearance, intersected in an irregular manner by fasciæ: these I have observed in some others of this genus; they are seemingly of a distinct nature from the dissepiments, being of a darker colour and thicker substance; but the most remarkable difference consists in their having nothing of that curved appearance discernible in the others, which is occasioned by the cylindricity of the filaments. Some red striæ, doubtless of the same nature, are represented in the figure of *C. distorta* in the *Flora Dan.* Tab. 920, to which this species bears a considerable analogy; especially in the remarkably abrupt manner in which some of the joints appear altogether colourless, leaving those with which they are immediately connected of their common

green hue. I have frequently observed many small grains attached to the filaments, but their minuteness is such as renders it impossible to determine whether they are capsules, seeds, or only some extraneous matter.

- A. Filaments magnified, 3.
- B. Small piece ditto, 2.
- C. Ditto ditto, 1.

A



B



C



Conifera conferructa.

CONFERRA CONFERVICOLA.

C. filamentis simplicibus minutis, sub confertis acutis; dissepimentis obfcuris, articulis cylindricis longitudine inequalibus.

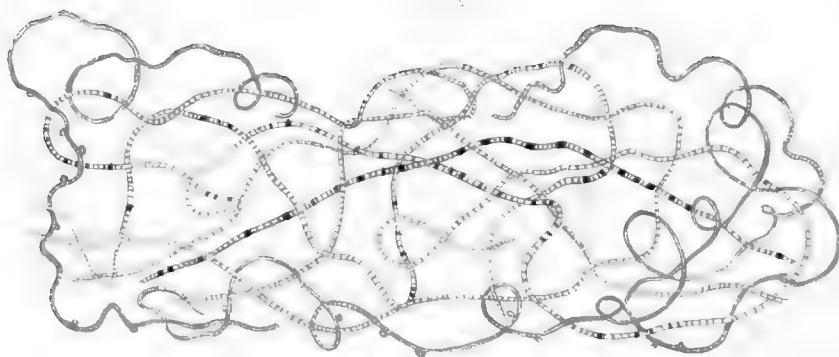
C. marina parasitica, tenuissima & brevissima glauca. Dill Musc. p. 552, t. 85, f. 21.

In the Sea, adhering to Fuci & Confervæ.

THIS delicate parasite is by no means unfrequently found, in the latest months of autumn, on *Fucus purpurascens*, *subfuscus*, *Conferva elongata*, *rupestris*, and other *Confervæ*; attaching itself principally to the ends of the branches, and often entirely covering them. It may be readily distinguished by its very short simple slender filaments, rarely exceeding one-eighth of an inch in length, and their dark glaucous colour. As well as in some other of the smaller unbranched species of this genus, the dissepiments are not placed in any regular order, but at various distances from each other; and among them fasciæ frequently appear, nearly similar to those described under the last species.

There can be no doubt of this being really the plant designed by Dillenius, in the place above quoted, and called by him 'Conferva upon Conferva,' though Dr. Roth, in the first volume of his *Catalecta*, has referred that synonym to his *C. mucor*, which seems to be a different plant; and if we may judge from his account of it, may probably be some not uncommon parasitic species in decay.

- A. *C. confervicola* natural size, growing on *Fucus purpurascens*.
- B. Ditto, on *C. rupestris*, magnified 3.
- C. Small piece ditto, 1.



Capnia

CONFERVA CAPILLARIS.

C. filamentis simplicibus teretibus rigidiusculis crispatis implicatis fragilibus; dissepimentis pellucidis; articulis cylindricis brevibus; capsulis sessilibus.

C. capillaris. Sp. Pl. p. 1636. Fl. Ang. p. 598. Fl. Scot. p. 988. With. IV. p. 135.

C. Linum. Fl. Dan. t. 771. Roth. Cat. Bot. I. p. 174.

C. filamentis longis geniculatis simplicibus. Dill. Musc. p. 25. t. 5. f. 25. A.

C. palustris, sive Filum marinum anglicum. Ray. Syn. p. 60. n. 16.

C. geniculata minima nostras. Morison. Hist. Ox. p. 644. f. 15. t. 4. f. 4.

In the Ditches and stagnant Pools of Salt Marshes.

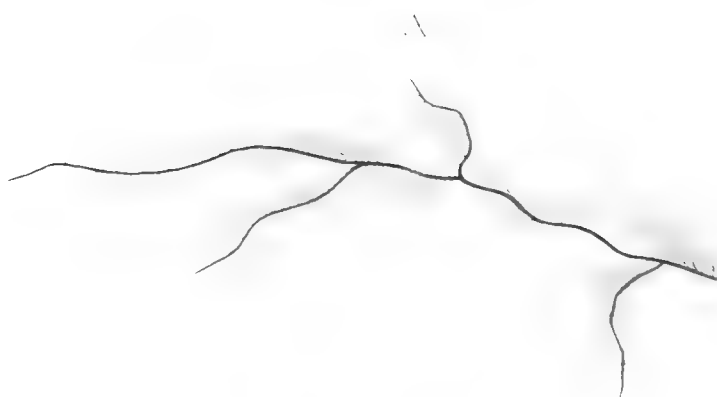
THIS species, no uncommon inhabitant of ditches near the sea, may, at first sight, be distinguished from all others by the thickness of its filaments, which in size are equal to large thread; by their brittle and rigid nature when fresh; by their never adhering together, and by the remarkably curled and entangled mode of its growth; from which circumstance I have hitherto found it impossible to trace with satisfaction either the root or apex of the plant, each end having an equally truncated appearance. The filaments extend to the surprising length of three or four feet; their colour is a pale yellowish green; the dissepiments are quite pellucid, but unless carefully examined they appear darker than the joints, there being a thin blackish line on either side of them: in many filaments they are extremely apparent to the naked eye, and some of them, even without the assistance of a glass, may be seen to be swelled and much blacker than the rest, which, in a specimen now before me, is the case in every fourth, but in some others I have not found them so regular; this dark appearance, when highly mag-

nified, proves to be occasioned by sub-elliptical granules imbedded in the filament, as is represented in the figure B. Some few are also found scattered in other parts of the joints, and I never doubted that these formed the fructification, till on the 8th of May, 1802, to our great satisfaction, my friend D. Turner and myself found the plant in the ditches about Yarmouth, copiously producing sessile roundish pointed capsules, precisely resembling those of *C. dichotoma*, &c.

C. capillaris, after it has been but for a few minutes exposed to the air, becomes perfectly flaccid, and when dried, the joints assume a kind of irregular alternately compressed appearance, which induced Linnæus, who evidently had seen only specimens in that state, so to describe it; but though he has in this instance been copied by Hudson, Lightfoot, and many other authors, this appearance is by no means so constant as to justify the stress he has laid upon it; and hence Dr. Roth, who found it apply better to the plant represented by Dillenius, t. 25. f. 5. B. which he believes to be specifically different, applied the appellation *capillaris* to that, and made the present a new species, under the name of *C. linum*. From the references nevertheless in the *Species plantarum*, I have very little doubt of ours being in reality what is there intended. I have subjoined a mark of uncertainty to Morison's figure, because he has drawn it as if it grew in the manner of a *Chara*.

This species is sometimes found in the pools near Yarmouth, rolled up into balls by the action of the waves, so as to resemble *C. ægagropila*. It differs from most others in not adhering to glass or paper after it is dried; nor does it, when once it has from that cause suffered contraction, ever recover its natural form by subsequent immersion.

- A. *C. capillaris* of its natural size.
- B. Ditto, without capsules, magnified 2.
- C. Ditto, with capsules, magnified 2.



Conopsea plantaginifolia

CONFERRA FLEXUOSA.

C. filamentis dichotomis rigidiusculis ; ramis flexuosis ; ramulis simplicibus tenuissimis, alternatim secundis patentibus, articulis cylindricis, dissepimentis obsoletis.

C. flexuosa. Fl. Dan. Tab. 882.

In the Pools in Yarmouth Salt Marshes.

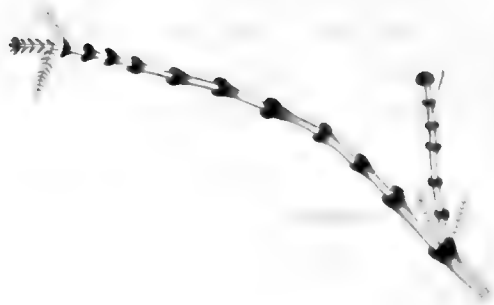
THIS beautiful species was added to our British Flora by D. Turner, Esq. who first gathered it from among the rejectamenta of the sea at Yarmouth, and afterwards discovered it growing abundantly near that town ; it has not hitherto been found in any other part of England ; but these plants have been so little attended to, that it may possibly not be uncommon in similar situations in this island.—The filaments grow in closely entangled masses at the bottom of the pools, and extend to the length of from four to eight inches ; they are finer than the hair of the human head ; their mode of growth is remarkably flexuose ; their substance rather rigid, and destitute of all lubricity ; their colour in general a pale yellowish green about the apices, but so dark as to be almost black in the main shoots ; they are seldom more than once or twice divided, but are from base to summit beset with spreading simple ramuli, often half an inch long, alternately arranged on each side of the shoots, and so fine at their extremities as to be almost invisible. No appearance of dissepiments can be detected without the use of the microscope, and even then they are very faint, and of a paler colour than the intervening joints.—Some opaque oval granules are frequently found scattered on the branches, and the ramuli appear to be filled with others which are less in size and more pellucid ; but whether either of them are the fructification I cannot positively decide, though I suspect it is not the former, having found exactly similar ones attached to other species. On this, as well as on many different *Confervæ*, small pellucid tubes, which I have represented on one of the branches, and which are supposed by Dr.

Roth to be a species of Polypus, may frequently be seen adhering in an irregular manner to its surface. The Conferva introduced by Dr. Roth in the second fasciculus of his Catalecta under this name, is a very different plant, and appears to be only a small variety of Ulva compressa.

- A. C. flexuosa, of its natural size.
- B. Ditto, magnified 3.



B



C



Conjerra alba.

CONFERVA ATRA.

C. filamentis ramosissimis moniliformibus sub-gelatinosis; ramulis setaceis, articulis apicem versus dilatatis ciliatis, ciliis verticillatis imbricatis.

C. atra. Fl. Ang. p. 947. With. IV. p. 134. Eng. Bot. t. 690.

C. fontana, nodosa, lubrica, filamentis tenuissimis nigris. Dill. Musc. p. 39. t. 7. f. 46.

In Rivulets and Springs; in a small Rivulet flowing into *Gors Velen* Lake, near *Llanfaethly*, and in a Spring called *Ffynnon bach y Lusg* in *Gors Bach*, between the Church and *Trefadog*, in the Isle of Anglesea, *Brewer*. Near Martin in Surrey, *Hudson*. Near Croydon, *Dickson*. At Lound, near Yarmouth, *D. Turner, Esq.*

THIS rare and beautiful species, though well represented by Dillenius, and described by Hudson, appears to have been but imperfectly known to modern Botanists, till it was figured in English Botany from a specimen gathered in a rivulet at Hopton near Yarmouth, by my friend Dawson Turner, who favoured me with the magnified drawing, fig. 2, from the delicate pencil of Mrs. Turner. It deserves, perhaps, to be considered one of the most rare of the British species; its nature and appearance being such, that it is hardly possible to suppose it should have been often overlooked, nor does it seem to be known to Dr. Roth, or any foreign botanist. The places of growth that it prefers, are limped rivulets, where it is found mixed with *C. gelatinosa*, to which it has more affinity than to any other known plant of the genus. Its colour, which in its earliest stage is a pale green, varies in the several periods of its growth through the different shades of green, till at last it becomes almost black: on a close examination to the naked eye, it has the appearance of a string of minute beads, which when the plant is highly magnified, proves to be occasioned by each joint being thickened towards its apex by whorls

of very minute mealy fibres, having something like a jointed appearance, but so minute as to make it almost impossible accurately to determine their nature.—
There is no danger of its being confounded with any other species.

- A. *C. atra*, of its natural size.
- B. Ditto, magnified 3.
- C. Ditto, magnified 1.



Conifera mutabilis

CONFERVA MUTABILIS.

C. filamentis ramosissimis gelatinosis sub-moniliformibus; ramulis penicilliformibus, fetaceis, ramosis; dissepimentis contractis, articulis brevibus.

C. mutabilis. Roth Cat. Bot. I. p. 197.

C. gelatinosa, γ. Fl. Ang. p. 598. With. IV. p. 135.

Conferva 'espece non decrite.' Vaucher in Journal de Physique, LII. t. 3. f. 7.

C. stagnalis, globulis virescentibus mucosis. Dill. Musc. p. 38. t. 7. f. 44.

In Ditches and Rivulets adhering to Sticks, Stones, or decaying Vegetables; about London and Yarmouth, common.

IT is sufficiently known that five of the *Confervæ nodosæ*, which Dillenius in his Hist. Musc. described as distinct, were afterwards united by Linnæus in the Spec. Plant. into a single species, under the name of *C. gelatinosa*. Of these, the first, second, and fourth, though submitted to a microscope, exhibit no farther difference than that of colour. The fifth is *C. atra*, figured in the preceeding plate; and the third, which is the plant now before me, even if but slightly magnified, instead of the short crowded verticillated ramuli, which occasion the characteristic bead-like appearance of *C. gelatinosa*, arrests the attention of the observer by its delicate pellucid almost colourless shoots, beset on each side by a number of very minute green tufts of ramuli, disposed generally in opposite directions. Dr. Roth seems to have been the earliest among modern botanists who accurately ascertained its nature, and he published it with a well-defined character in the first fasciculus of his Catalecta Botanica, giving to it the name of *mutabilis*, on account of a very singular change that he observed it undergo, in different periods of its existence.—He has erred in referring, as a synonym to Dillenius, '*C. fluviatilis sericea tenuis*,' t. 6. f. 34; but his mistake is by no means surprising; for that figure not badly expresses the general habit of the plant; and the etching above referred to, which

from Dillenius's Hebarium, and original drawings in the collection of Sir Joseph Banks, is known to have been designed for *C. mutabilis*, is very coarsely executed. It was first pointed out to me as a distinct species by my friend D. Turner, who gathered it near Yarmouth; and I have since found it in considerable abundance in most of the pools and ditches about London. Its length varies from half an inch to three inches, and its colour from a light to a dark green. The main shoots are nearly colourless, and formed of numerous short joints, contracted towards each end, and containing in their middle a band of granules, which we must suppose to be the fructification of the plant; though from its near affinity to *C. gelatinosa* one would be rather disposed to look for the same sort of fruit as is found in that species. At their dissepiments, the stems throw out small tufts of green ramuli, scarcely equal to one-fourth of their thickness, and so divided and sub-divided into extremely minute expanding branches, as to give them a pencil-like appearance; in some specimens they are of a compact oblong form, and in others more lanceolate, with the extreme branches considerably lengthened out.

For the drawing I am indebted to my friend Joseph Woods, jun. F. L. S.—
B represents a piece, which, though not so beautiful as many that might have been selected, we thought better calculated to give a clear idea of the plant.

A. *C. mutabilis*, natural size.

B. Ditto, magnified 1.





B



Conifera glomerata

— *Palmetto* — 24th August 1862

Exhibition 1862

CONFERVA GLOMERATA.

C. filamentis ramosissimis; ramis alternis; ramulis secundis, fasciculatis, penicilliformibus; dissepimentis pellucidis; articulis cylindricis longiusculis.

C. glomerata. S. Plant. p. 1637. Fl. Ang. p. 602. Fl. Scot. p. 993. With IV. p. 140. Fl. Dan. t. 651. 2.

C. cristata. Roth. Cat. Bot. I. p. 193. II. p. 220. Fl. Germ. III. p. 512.

C. fontinalis ramosissima glomeratim congesta. Dill. Musc. p. 28. t. 5. f. 31. Ray. Syn. p. 59. n. 8.

C. viridis capillacea, brevioribus fetis, ramosior f. Conferva minor ramosa. Morison. Hist. Ox. III. p. 644. f. 15. t. 4. f. 2.

On Stones and Wood in clear Rivers and Streams.

THIS elegant species delights in the purest waters, and, as may be concluded from its appearing in nearly every Flora, adorns most of the limpid streams in Europe.—The root is a small callus, whence arises the principal stem, varying from two or three inches to a foot in length, and repeatedly divided and subdivided; the ultimate branches are alternate, and beset on the upper side with a ramulus at the end of nearly every joint, so as to give them a bush-like appearance, which is highly characteristic of the plant. The fructification has not yet been discovered, but I think there can be little doubt of its consisting in capsules nearly similar to those figured in the other species. Linneus has erred in the synonyms of this plant in the Species Plantarum, he having there referred to ‘Dill. Musc. 28. t. 5. f. 32. and t. 5. f. 28 & 29.’ though under *C. vagabunda* which immediately precedes it, he had before referred to t. 5. f. 32, and again to t. 5. f. 29, as his *C. rupestris*. He also fortunately gave as a synonym of this plant Morison’s *C. viridis capillacea*, &c. to which Dillenius refers, as his *C. fontinalis ramosissima*

glomeratim congesta, t. 5. fig. 31. and which, with the former, are good representations of this plant. Dr. Roth has united *C. glomerata* and *C. sericea* into one species under the name of *C. cristata*, and I have but little doubt that he has confounded two species, as an authentic specimen with which I was favored by my friend Dawson Turner, is certainly distinct from *glomerata*, which he must have included in his description, by his referring to the excellent figure in the *Flora Danica*.

Though liable to considerable variations, as well in the length and thickness of the filaments, as in their being sometimes more or less branched, yet it may be at first sight distinguished from other species, by its beautiful green color, and characteristic bush-like ramuli. It is often much infested with *C. flocculosa*, which grows parasitically on it, and sometimes nearly covers it. It adheres to both glass and paper.

For the drawing I am indebted to my friend Joseph Woods, jun. F. L. S. — it well represents the plant in a rather advanced stage of growth.

A. *C. glomerata*, natural size.

B. Ditto, magnified 3.



B



Conferia praeta

CONFERVA FRACTA.

C. filamentis ramosissimis implexis ; ramis ramulisque divaricatis ; articulis adultioribus oblongis junioribus cylindricis ; capsulis sessilibus sub-rotundis.

C. fracta. Fl. Dan. T. 946.

C. divaricata. Roth. Cat. Bot. I. p. 179. t. 3. f. 1. Fl. Germ. III. p. 510.

In stagnant Ditches and Pools.

THIS species was first described and figured in the Flora Danica under the name of *C. fracta*, and afterwards by Dr. Roth in his *Catalecta Botanica*, who was not then aware of its having been pre-described, under the name of *C. divaricata*: the former name appears to be most eligible, not only on account of its priority, but also because it is peculiarly characteristic. I first detected it near Yarmouth; afterwards copiously producing sessile capsules in Lock fields, near London, and since in many other places, and I think there is little doubt of its being one of our most common species. It grows in densely entangled masses, generally floating on the surface of stagnant waters, and is of a dull dark green color. The filaments vary in length from one to four inches, are equal in thickness to the human hair, rather rigid, and divided and subdivided into branches in an irregular manner: the branches are divaricate, most commonly alternate, but sometimes several together are disposed on the same side: in length they differ very much, some being long, and others so short, and apparently abruptly terminated, as to give the plant a broken appearance, which is highly characteristic, and by which, and its divaricate ramifications, it may be distinguished from its congeners. The joints, which otherwise are cylindrical, frequently appear to be swelled, and assume an oblong form. This appearance I have also observed, though far less frequently, in *C. littoralis*, *rosea*, and some others, and I suppose that

it must be attributed to age. It is often much infested by polypi. Professor Mertens is of opinion that this is the plant intended by Dillenius, in his *Hist. Musc.* t. 3. f. 11. and named *C. bullofa* by subsequent authors, but the specimen in Dillenius's *Herbarum* is certainly another species, and I feel no hesitation in adopting D. Turner's opinion, that many of those plants which grow sufficiently entangled together to retain bubbles of air, and are thereby floated on the surface of the water, have been confounded together by all authors under that name, and consequently that the *Confervæ bullosæ* are a family, and not a species of this tribe.

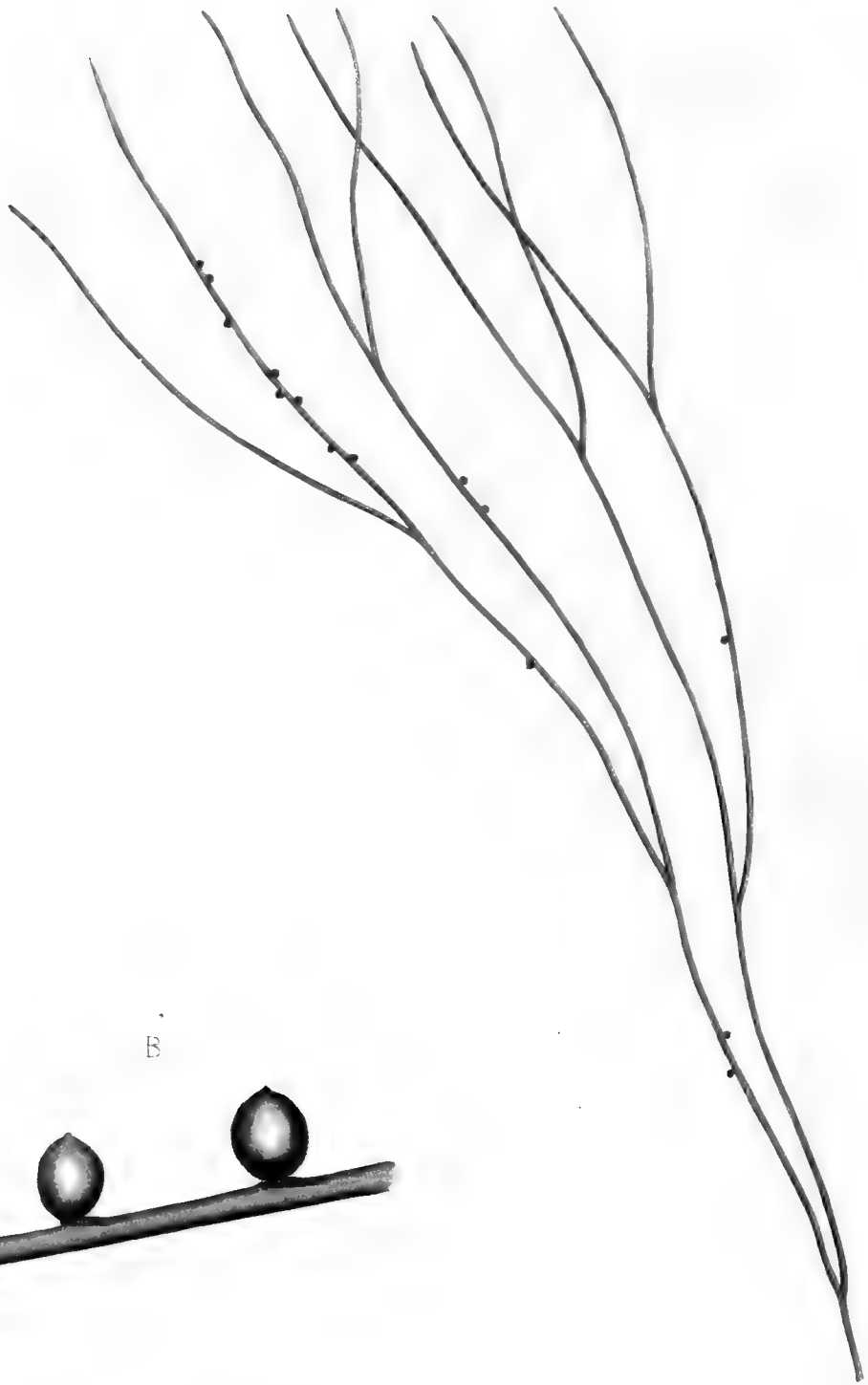
After being dried, the *Confervæ bullosæ* have been used as wadding for stuffing garments, and wove into coarse household linen. Weis in his *Plantæ Cryptogamicæ Floræ Gottingensis*, page 23, relates that formerly the river Unstrut, after inundating a large tract of country in Upper Saxony, on again retiring into its proper channel, left a great quantity of *C. bullofa*, which, having been gathered and dried by the inhabitants, was used by them for stuffing their garments, but that it occasioned violent pains in their limbs. It is also used for making coarse paper.

A. *C. fracta*, magnified 3.

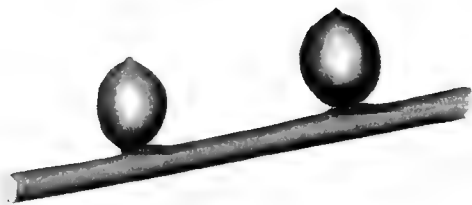
B. Ditto 1.



A



B



Conifera dichotoma

CONFERVA DICHOTOMA.

C. filamentis, fasciculatis strictis fastigiatis dichotomis sub-articulatis, difsepimentis obsoletis; articulis longissimis, capsulis ellipticis sessilibus.

C. dichotoma. Sp. Pl. p. 1635. Fl. Ang. p. 593. Withering. IV. p. 129. Eng. Bot. t. 932.

Ceramium dichotomum. Roth. Cat. Bot. I. p. 153. Fl. Germ. III. p. 474.

C. dichotoma fetis porcinis similis. Dill. Musc. p. 17. t. 3. f. 9.

C. Plinii, fetis porcinis similis. Ray. Syn. p. 58.

In Ditches, common.

THIS *Conferva*, in dense masses, occupies, and often nearly fills the ditches in many parts of England, throughout the spring and summer months; conspicuous for its dark green color, matted appearance, and above all, its erect fastigiated summits, which, at first sight, bear a strong resemblance to a parcel of hog's bristles, to which they are aptly compared by Dillenius. The filaments are membranaceous, tubular, filiform, in general about two feet long, and considerably thicker than horse hair, always straight and simple, or but once or twice divided, till they arrive at a few inches from their apices, when they are branched with repeated dichotomies, at uncertain but short distances from each other, the angles of the divisions being every where acute. The summits are blunt; the length of the joints irregular, though always considerable; in a fresh state, their beginning and termination can hardly be discovered, but, after the plant is dried, they appear slightly contracted at each end. The capsules, which were first discovered by Professor Mertens, of Bremen, are rather longer than the width of the filaments, and scattered without order about them, sometimes singly, and sometimes in clusters of five or six together. A doubt is suggested in English Botany, whether these are true capsules, or only some extraneous bodies; I have however been enabled to decide that it is without foundation, and that the seeds

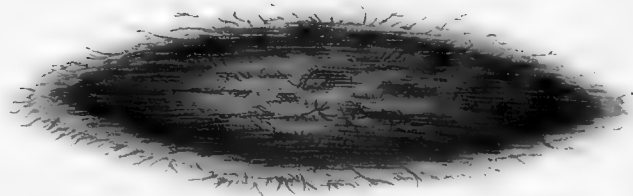
escape, as I believe they do universally in those plants, which constitute the genus *ceramium* of Roth through an aperture, which, when the seeds are matured, is formed at their apices. They are found only in the spring.

C. dichotoma grows about the bottom of ditches; as it approaches decay, it rises to the top of the water, and there exposed to the sun and air loses not only its natural form, but also its color, turning to a pale yellowish green, and, becoming inflated with air, bubbles like many other fresh water species. Few plants of this tribe have been either longer or better known. When dried, it becomes rigid, and adheres but very slightly to either glass or paper.

A. *C. dichotoma*, natural size.

B. Ditto magnified 2.

11



12



Conjura frigida

CONFERRA FRIGIDA.

C. filamentis inarticulatis repentibus ramosis; ramis subdichotomis alternis, exsiccatione distinctis; capsulis sessilibus rotundis.

C. frigida. Roth. Cat. Bot. I. p. 166. Fl. Germ. III. p. 491.

C. amphibia fibrillosa et spongiosa. Dill. Hist. Musc. p. 22. Tab. 4. f. 17. A.

C. terrestris exilis fibrillosa. Ray. Syn. p. 59. n. 7.

On the Ground in moist shady places.

THIS *Conferva*, not unfrequently found in turnip-fields during the winter and early months of spring, particularly in a northern exposure, and cold soil, had been considered by Dillenius and all other writers, as not specifically distinct from *C. amphibia*, till Dr. Roth separated it in the first volume of his *Catalecta Botanica*. His reasons for thus doing appear to me so convincing, that, though in all matters of this nature, I would wish to proceed with the utmost caution, I have felt no repugnance in adopting them, and am convinced my reader will not be displeased at my introducing them at foot in the words of their author.* Dillenius, as well from his figure as description evidently knew both species; though, not accustoming himself to the use of a microscope, he regarded them as the same. How far Hudson, Lightfoot, and Withering were equally acquainted with both, may perhaps admit of some doubt: for my own part I should be inclined to think that they refer to this alone, but their descriptions are of such a

* “*Habitus enim suum sub quavis conditione retinet et rami vel ramuli distincti exsiccatione nunquam cœunt in apices rigidiusculos, aculeos referentes, nec unquam in altum excrescunt, sed depressi repent. Septentrionalem regionem et frigidam semper spectat illamque tantum amat, madificatione spongiæ in modum aquam non imbibit, ut Conferva amphibia nec in majus volumen sese expandit. Differt insuper. 1. stratis filamentorum tenuioribus, laxè et inordinate expansis et depressis: nec crassis, superiore superficie quasi reticulatis et filamentorum ramulorumque apicibus erectiusculis, 2. Filamentis rigidioribus, quasi herbaceis, obscuris, linea tantum longitudinali pellucida præditis, cum striis transversalibus in cortice: nec membrana tenuissima sub pellucida, tubulosa, sinuosa et rugosa absque corticis evidentioris, quasi herbacei, vestigio compositis.*” Roth. Cat. Bot. I. p. 168.

nature that it is a matter of very little consequence. *C. frigida* covers the ground generally in irregular patches two or three inches in diameter, of a rather pale green color, very slightly adhering to the soil, and if examined while growing, is seen to form several strata of loose unconnected filaments. Its mode of ramification is not altogether dichotomous, but it rather seems to throw out a series of alternate branches issuing at acute angles with the stem. The filaments are hardly so large as human hair; their length is probably about an inch, but this, from their matted mode of growth, cannot certainly be detected; they are very flaccid, and when the plant is taken up, fall together, but are wholly destitute of lubricity, so that after they are dried, they neither adhere to paper or glass. In this state they turn to a pale yellowish green. The capsules which D. Turner and myself first found in a field adjoining the ruins of Burgh Castle, must be considered very rare, from their having escaped the notice of Dr. Roth, and his indefatigable friend Professor Mertens; they are but thinly scattered over the filaments. Even under the highest powers of a microscope the frond exhibits no appearance of any tendency to articulation. Dr. Roth, in the second volume of his *Catalecta*, page 217, describes a species under the name of *C. arenaria*, which, at first sight, he says may be taken for *C. frigida*. I have not at present seen this, though I hope hereafter to be able to add it to the British catalogue, having no doubt but that many more *Confervæ* will be found growing on the ground which have at present escaped our notice.

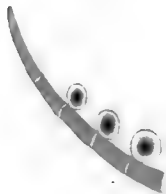
A. *C. frigida*, natural size.

B. Ditto magnified 1.





B



Conferia rosea

Conferia rosea

CONFERRA ROSEA.

C. filamentis decomposito pinnatis tenuissimis ; ramis ramulisque alternis, approximatis ; dissepimentis contractis ; articulis oblongis, capsulis secundis sub-globosis.

Conferva rosea. Eng. Bot. t. 966.

Ceramium roseum. Roth. Cat. Bot. II. p. 182.

On Planks and *Fucus vesiculosus* in the River Yare, about Yarmouth Bridge, and on Rocks in the Sea, near Swansea.

MY friend D. Turner has justly remarked to me that "it may be considered a striking instance, how little the genus *Conferva* has been attended to by botanists, that above twenty years ago, Mr. Wigg gathered the present species at Yarmouth, and preserved specimens of it in his Herbarium, which was so often visited ; but that till Mr. Sowerby found it there in 1797, and I, on sending a plant of it to Dr. Roth, was informed of its being his *Ceramium roseum*, no author of this country ever noticed it." That such has been the case with many other species, I have already had occasion to mention in this work, and is by no means a matter of astonishment, but the present considered as to its beauty, can hardly fail of attracting the most indifferent observer, and regarded as to its habit and mode of growth is so different from all the rest, that no botanist could ever confound it with any common species. The root of *C. rosea* is a small expanded disk, which gives rise to several stems, from one and a half to three inches in length, pinnated from their base with numerous alternate branches, which are again repeatedly subdivided in the same manner, so that as they approach the summits, they have a very clustered appearance ; in their thickest parts they are nearly as fine as the hair of the human head, and so extremely fine towards their apices, as to be scarcely visible. From the great tenuity of the shoots the substance of the whole is peculiarly flaccid, on which account it is difficult to expand it properly, but the

ramuli, when floating in water, resemble beautiful feathers. The joints are nearly oblong, and filled with a red fluid, which, after the plant has been immersed sometime in fresh water is given out, and stains the paper in drying. When perfectly fresh, the color of the whole is a rosy hue mixed with brown, uniform throughout, except that the leading branches are darker than the rest.— It is not till after it has been exposed to the air, or kept in fresh water, that the joints become pellucid, as described by Dr. Roth. The capsules are in general very numerous, and arranged on the upper sides of the ramuli, nearly globose, very minute, and of the same color as the frond: when dried, hardly any species adheres more firmly to paper or glass.

- A. *C. rosea*, natural size.
- B. branch of ditto, magnified 2.
- C. small piece of ditto 3.



A



C



B



D



Conifera repens

CONFERVA REPENS.

C. filamentis minutis repentibus densè implexis; ramis ramulisque subfecundis, dissipimentis parum contractis; articulis cylindricis.

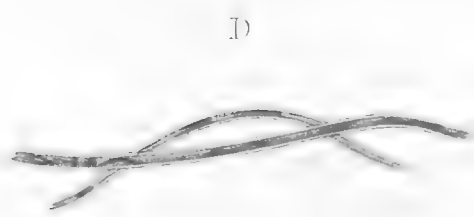
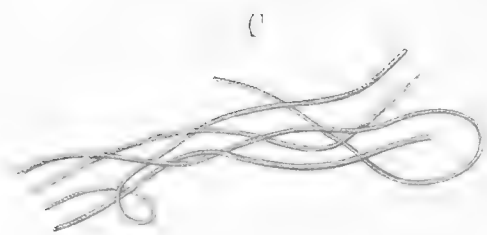
C. marina per brevis villosa & cirrosa. Dill. Musc. p. 23. t. 4. f. 21?

In the Sea parasitical on Fuci—At Yarmouth and Dover.

THIS delicate little parasite is found not unfrequently in the autumnal months attached to fucus lumbricalis, radiatus, & crispus, & Conferva elongata. It grows in small closely matted patches, and invests the plants on which it grows in a very peculiar manner, as was first pointed out to me by my friend Joseph Woods, jun. to whom I am indebted for the drawings A & D, the latter of which is made upon a larger scale than it really appeared under the microscope, in order to shew more clearly, than is otherwise possible, its truly repent filament. He remarked that the branches rise only from those joints of the main stem in which there is a radicle, but that they are never opposite, and generally at the opposite extremities of the branch. The length of the filaments seldom exceeds three or four lines; in thickness they are equal to the hair of the human head. Their whole length is beset with minute branches slightly incurved, almost patent, acuminate at their apices, pointing upwards, and disposed on the same side of the stem, as are most frequently the ramuli also. The joints are cylindrical, rather long, and slightly contracted at the dissipiments, which are pellucid. The color of the whole is a ferruginous red, inclining after it is dried to tawny. It adheres, though not firmly, to both glass and paper. I have put a mark of doubt to the reference above quoted to Dillenius, because I have not yet seen his collection, and he says in his description, that the color of the plant is olivaceous or dark green. This circumstance, however, does not prevent my believing that he really meant this species, and I would, on that account, have named it *C. cirrosa*, had not the name been previously given to a different one by Dr. Roth, in the

second volume of his *Catalecta*. May not the present be Hudson's *C. fulva*, the description of which, in the *Flora Anglica*, is unfortunately so short, that unless any authentic specimen of it exists, which I believe there does not, it will always be impossible to tell what he meant by that name.

- A. *C. repens*, natural size, growing on *Fucus lumbricalis*.
- B. Ditto - magnified 3.
- C. Ditto I.
- D. Ditto, on a larger scale than it appeared in the microscope.



Conferia mycelioides

CONFERVA MYOCHROUS.

*C. filamentis densissimè implexis ramosis ; ramulis simplicibus subsecundis
binis incurvis.*

In Alpine Torrents at Beddgelert, and the lower regions of Snowdon. Dawson
Turner, Esq.

FOR the following account of this species, which I believe to be entirely distinct from every other heretofore described, I am indebted to my friend Dawson Turner, through whose indefatigable exertions it has been discovered, and to whom I am also indebted for the drawings A and B.

“ This *Conferva*, in the month of July last, was extremely abundant in many of the torrents that flowed from the immense mountains which surround the beautiful vale of Beddgelert in Caernarvonshire : it grew upon their rocky beds, matting the stones often, to a considerable extent, with a velvety covering, three or four lines in diameter, which, when taken out of the water, might aptly be compared to the skin of a mouse. Its color was a dark glossy brown ; its substance soft to the touch ; its filaments so closely matted together, as to form almost an inseparable mass. Those which I was able to detach, were seldom more than half an inch long, but I never was fortunate enough to find any with a root. Examined under a microscope, their color appeared a pale subdiaphanous reddish brown, and there were in some specimens, faint appearances of septa, but they were no where so evident as to warrant the inserting them in the figure. The mode of ramification in this plant is very singular ; some of the filaments being apparently quite simple, as in figures C & D. others twice or thrice trunked with patent dichotomies, and, as in figure B. beset with pairs of simple incurved acuminate ramuli, arranged almost entirely on one side. These latter are sufficient at once to distinguish, and indeed the size of its filaments, which are as fine as the finest wool, will always keep it separate from *C. amphibia*, the only species

I know to which it bears any strong resemblance. Some parts of Dillenius' description of his '*Conferva mucosa confragosa rivulis inascens*' so exactly correspond with the present plant, that it may justly be doubted, whether, when he wrote his account of that species, he did not blend two or three together: as, however, Mr. Hudson has referred that synonym to a different plant, and all succeeding botanists have followed him in so doing, it is not worth discussing the question."

A. C. myochrous, natural size. "

B. C. Ditto magnified 2.

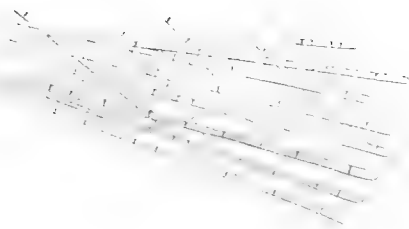
D. Ditto 1.



A



B



Coniophora limosa

CONFERVA LIMOSA.

C. filamentis simplicibus, tenuissimis, brevibus, mucosis, densissimè compactis caeruleo-viridescentibus lubricis; dissepimentis indistinctis.

C. gelatinosa, omnium tenerrima & minima aquarum limo innascens. Dill. Musc. p. 15. T. 2. f. 5. Ray, Syn. p. 477.

On the muddy edges of Rivers, Ditches and Ponds.

THOUGH hardly any *Conferva* is more abundant than the present, especially in Spring and Autumn, it appears nevertheless to have remained unarranged in the system, since the days of Dillenius and Ray.—It generally grows upon the mud, left at the edges of pools or ditches, presenting to the naked eye, except immediately at the margin where it is fibrous, a widely expanded, thin, shapeless gelatinous mass, resembling a tremella, of a very dark and glossy hue; sometimes too it floats upon the surface of the water, and is conspicuous by its dark green velvety appearance. In either case, the only mode to examine it is to carry it home, without allowing it to dry, and put it in a pan of water, where, though when first immersed, its filaments are so thickly matted that they cannot be disentangled, yet in the space of a night it will shoot out an immense quantity of threads, visible to the naked eye only from their number. The aid of a microscope is necessary to observe them properly, and, thus examined, they present a curious appearance, for their length is not more than half an inch; they are obtuse at each end, and lie crossing each other without any apparent order—some indeed seem even to be wholly unconnected with the rest. If the highest power of a good glass be applied, they seem to be jointed in an irregular manner, but this apparent irregularity is probably occasioned by the want of sufficient magnifiers, which, if we possessed, I am of opinion we should find that the length of the joints is about equal to their breadth, as I have often faintly discerned two or more contiguous joints of these dimensions. When the interior substance has collapsed

by drying, if carefully examined, their tubular structure may be observed. Dillenius's description is so good, that I think it is impossible to mistake him; he has published no representation of it, assigning as a reason that since its parts elude the sight, it would be rashness to attempt a figure. There is however a rough pencilled sketch among the original drawings in the extensive library, so happily for science, belonging to Sir Joseph Banks, which merely represents a number of fibres lying together without any order.

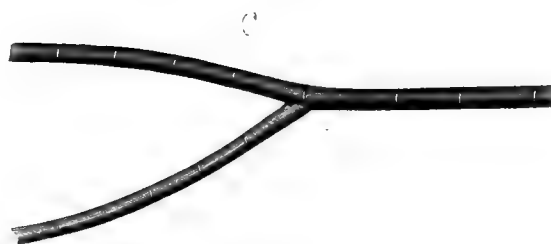
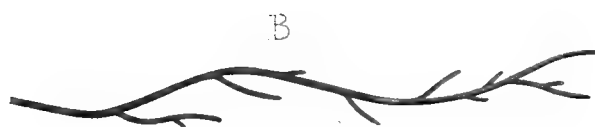
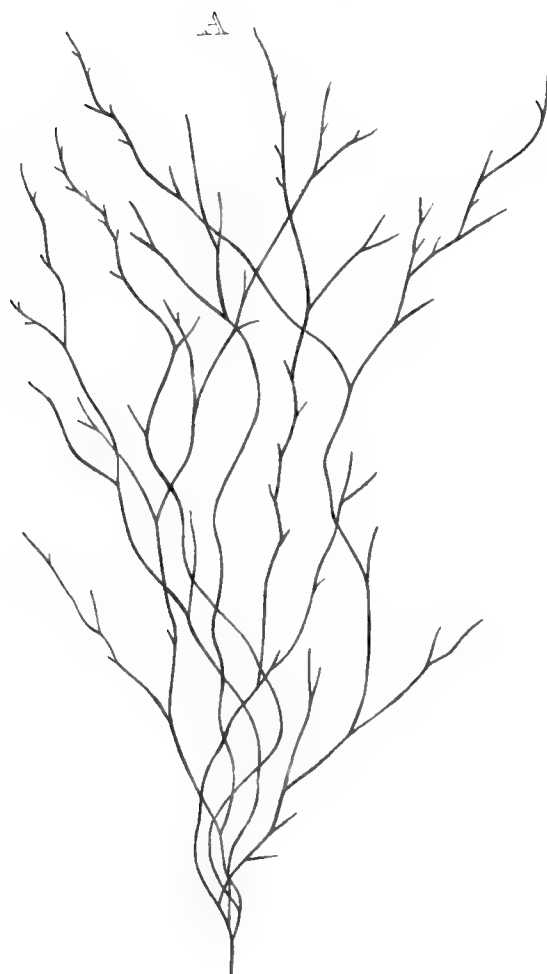
The growth of this plant is astonishingly rapid, so that I have observed a very sensible difference in the length of its filaments in half an hour, and to this, and their extreme minuteness, which allows the slightest motion of the water, in which they are examined, to affect them, I attribute the motion observed by M. Adanson, and described in an excellent paper in the *Histoire de l'Academie Royale des Sciences* for 1767, page 75. Here M. Adanson relates the following discovery, which, though I have not been so fortunate as to see the actual division of the filaments he mentions, seems, from many appearances I have observed, extremely probable, and highly deserving of further attention: "Lorsque ces filets sont parvenus à leur dernier terme d'accroissement, qui excède rarement trois lignes, alors le dernier nœud, qui n'a guère qu'une demi-ligne de long, s'en sépare et s'allonge; ses deux bouts s'arrondissent, et il devient absolument semblable à celui dont il s'étoit séparé, et capable d'en produire à son tour de nouveaux."

Dr. Roth's *Conferva velutina* seems from his account* of it to resemble the present species both in substance and mode of growth, but specimens from himself, and his describing it 'filamentis ramosis' prove them to be different.

A. *C. limosa*, natural size.

B. Ditto magnified 1.

* Cat. Bot. l. p. 166.



Conferva diffusa

CONFERVA DIFFUSA.

C. filamentis ramosis diffusis; ramis sub-dichotomis flexuosis remotis; ramulis brevibus approximatis apice obtusis; dissepimentis pellucidis; articulis longiusculis.

Conferva diffusa. Roth, Cat. Bot. II. p. 207. t. 7.

On Rocks in the Sea near Swansea.

DR. ROTH, who first described this species, informs us that it was discovered growing on decaying wood and rocks at the Helder, by his indefatigable friend, Professor Mertens; to whose pencil we are indebted for the figure of it in the second fasciculus of the *Catalecta Botanica*. It grows in loosely-entangled bundles, varying from two to six inches in length, of a pale-green color, and more rigid nature than most of its congeners; so that, when drawn out of the water, its filaments do not collapse. The root is a minute callus; each filament is in size nearly equal to horse hair; forked near its base, and afterwards repeatedly dichotomous, at remote, but irregular intervals, with alternate, flexuose, rigid branches, often entangled almost as much as those of *Fucus plicatus*. The ramuli are numerous, short, solitary, and simple: sometimes placed alternately, but more frequently two, three, or four on the same side, and uniformly blunt at their apices: they originate at the dissepiments, which are pellucid. The joints are long, and cylindrical while fresh; but, in drying, generally contract in a very curious manner, as is represented in Cat. Bot. t. 7. C. & D.—In which also at B a number of small appendages are introduced. There were many agreeing with them in every thing but color on the plants I found at Swansea, which proved on examination to be seedlings of *Conferva rubra*; a species which, as well as many *Polypi*, often infests this plant. I can hardly take a better opportunity of

observing, what I trust I may be allowed to observe without fear of being considered guilty of detraction, that almost all the plates of *Conservæ* in the *Catalecta Botanica* are copied from plants, either in a dry state, or which have been dried. They are not therefore in general applicable to the species examined while recent. Many of the descriptions labor under a similar disadvantage, from the learned author's residing at so great a distance from the sea. It was necessary to mention this circumstance on my own account; because, had it not been noticed, it must have been thought that the figures in this work contradict those of Dr. Roth, and, still more, because nothing would be more likely to mislead a young botanist. The fructification of *C. diffusa* has not yet been discovered; it adheres, when dried, very slightly to paper, and not at all to glass.

- A. *C. diffusa*, natural size.
- B. Ditto, magnified 4.
- C. Ditto, 2.



Conferva distorta

CONFERVA DISTORTA.

C. filamentis ramosis articulatis fasciatis; ramis ramulisque distortis; diffipimentis obsoletis, articulis brevibus.

C. distorta. Fl. Dan. t. 820.

In a boggy Pool on Sketty Burroughs near Swansea.

ALTHOUGH, in the present state of our knowledge of *Convolvæ*, it is impossible with certainty to say which species are most rare, or which most common, I cannot but think that the present has a claim to be considered as one of the scarcest of the tribe. Muller, whose figure in the *Flora Danica* is excellent, was the first who noticed it; and he appears to have found it only in one place, and there but very sparingly.

I have a German specimen, through the kindness of my friend Dawson Turner, from Dr. Roth, under the apt name of *Ceramium natans*; and I do not know that it has been found by any other botanist, till I fortunately met with it in small quantity last autumn in some boggy pools on Sketty Burroughs near Swansea. It grows parasitically in short thick tufts on decaying grass; attached to small pieces of which it frequently floats on the surface of the water. The root I have not been able to discover; its filaments are generally about half an inch in length, extremely slender, and of a beautiful dark green color, varying to a lighter hue as they approach to decay. The branches are seldom numerous, but have a very peculiar twist at their ramification, from which is derived the specific name of the plant, and which is its greatest peculiarity. Muller, though his figure abounds with transverse lines, describes this species '*filamentis inarticulatis*' and hence appears to have discovered a difference between these lines

and true dissepiments; but although 'fasciæ,' similar to those mentioned under *C. muralis*, with which this species has a strong affinity, frequently appear, dissepiments may also be discovered; and indeed I consider the remarkably abrupt manner in which the juices are frequently seen to have collapsed in some others as well as the present species, as a clear indication of their existence. To the naked eye the size of the filaments, their mode of growth, and color; and, under the microscope, their singular ramification, at once distinguish *C. distorta* from all other species. It adheres, when dried, to either glass or paper.

- A. *C. distorta*, natural size.
- B. Ditto, magnified 3.
- C. Ditto, 1.



B



Cynura rupestris

CONFERVA RUPESTRIS.

C. filamentis ramosissimis fasciculatis strictis virgatis adpressis, apice truncatis : dissipationis parùm contractis, crystallinis ; articulis longis, cylindricis.

C. rupestris. Sp. Pl. p. 1637. Fl. Ang. p. 601. Fl. Scot. p. 994. With. IV. p. 140. Fl. Dan. t. 948. Roth, Cat. Bot. II. p. 208. Fl. Germ. III. pars 1. p. 516.

C. glauca. Roth, Cat. Bot. II. p. 208. t. 6.

C. marina trichodes ramosior. Dill. Hist. Musc. p. 28. t. 5. f. 29.

C. marina trichodes f. muscus marinus virens tenuifolius. Ray. Syn. p. 60.

On Rocks and Stones in the Sea, common.

THIS elegant species, one of the most common ornaments of our shores, appears to have been longer and better known than most of the *Confervæ*. Its root, a small callus, gives rise to a number of dark green filaments, somewhat rigid to the touch, which are so repeatedly branched, that each of them assumes a bushy appearance; the mode of ramification is irregular, some of the branches being alternate, and some opposite; while, towards the summit, three or four are frequently disposed without interruption on the same side.—All of them are erect, and remarkable for their straightness, as well as for being placed very close to each other: the ends are always blunt, and generally so much so as to have a truncated appearance; but in some specimens, this is more strikingly the case than in others. On this, and other small variations, to which this plant is liable, Dr. Roth, who does not appear ever to have had an opportunity of examining it when fresh, has founded another species under the name of *C. glauca*, which, upon the

authority of specimens sent from Professor Mertens to D. Turner, I have felt no hesitation in uniting with the present, nor can I see sufficient grounds to describe them even as separate varieties.

The diffipiments are a little contracted, and generally quite colourless; but, before the plant is exposed to the air, or the juices at all collapsed, they on the contrary appear darker than the other parts of the filaments, the joints are cylindrical, and of a deeper color towards their extremities; their length, though subject to some variation, even in the same branch, is seldom less than double their width.

Dillenius's "*Conferva fluviatilis trichodes, extremitatibus ramosis*," which most authors have followed Hudson in making a variety of this plant, appears to be a distinct species:—it is the *Ceramium asperum* of Dr. Roth. In drying *C. rupestris* retains its beautiful green color; but the joints contract alternately in a curious manner, as figured in the *Catalecta Botanica*:—it adheres to neither glass nor paper.

- A. *C. rupestris*, natural size.
- B. Ditto, magnified 3.
- C. Ditto, 1.

A

13



Confervea pectinatis

[illegible]

CONFERVA PECTINALIS.

*C. filamentis, simplicibus, pellucidis, fractis, acuminatis; dissepimentis
sæpè solutis; articulis brevissimis medio crystallino-pellucidis.*

C. pectinalis. Muller in Nov. Act. Pet. III.

C. bronchialis. Roth. Cat. Bot. I. p. 186. Fl. Germ. III. p. 520.

In rivers and stagnant waters, adhering to decaying wood and vegetables.

MULLER, who first found this singular species, and published an excellent figure of it in the paper above referred to, observes that it is abundant in the ditches about Pyrmont. Dr. Roth also remarks that it is not rare in those near Vegefack; and though not one of our most common species, it frequently occurs in similar situations in many parts of this country, especially in the neighbourhood of London, where it is very plentiful, and where, early in the spring of last year, I first found it in the company of my friend, Joseph Woods, junr.

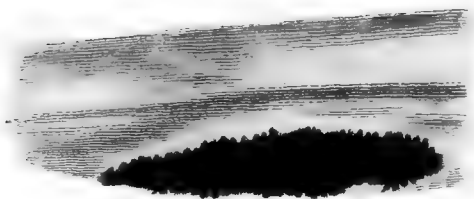
The filaments are of a dirty green colour; seldom exceeding half an inch in length, and to the unassisted eye, resemble decayed vegetable matter. When entire they gradually taper to a point, and, as Muller observes, bear some resemblance to the antennæ of a lobster, but I could never observe the appearance of cylindricity represented in the figure of it given by that botanist. The dissepiments are very conspicuous, and at these the filaments frequently break; the parts remaining connected at only one extremity; which, when it repeatedly takes place, gives the plants so much the appearance of *focculosa* as to make it somewhat doubtful whether the species are distinct: the joints are very short, and appear coloured towards each end by a green fluid, which, soon after the plant is taken from the water, and as it approaches to decay, collapses, sometimes forming into small globular masses, and sometimes disappearing entirely.

C. pectinalis may be readily distinguished from its Congeners by the remarkable change it undergoes when dried ; it then turns to a greenish ash-colour, and shines as if covered with gum-water. In that state it adheres firmly to either glass or paper.

A. *C. pectinalis*, magnified, 2.

B. Ditto, 1.

A



B



C



Conferva alveolata

Chara alveolata

CONFERVA ATRO-VIRENS.

- C. filamentis rigidiusculis ramosis; ramis divaricatis, sub-secundis, utrinque attenuatis, apicibus obtusiusculis; dissepimentis pellucidis; articulis brevissimis tripunctatis.

On the wet Rocks, forming the banks to the Dylais River, near Neath.

THIS singular, and hitherto unobserved species, abounds on the dripping rocks which constitute the banks of the River Dylais, near where it forms the romantic cascade, so well known to those who have visited the highly picturesque neighbourhood of Neath, in Glamorganshire. It grows in thick bushy tufts, of a blackish green color; and from its rigid nature, is liable at first sight to be mistaken for one of the Musci, with which it is not unfrequently mixed. The root appears to be a very minute callus. The filaments, from a quarter to half an inch in length, are divided into numerous branches, which are disposed without any apparent order, though several together are mostly on the same side of the main stem, with which they form a very obtuse angle: they taper in some degree both towards their origin and apex, but terminate rather bluntly. The dissepiments are pellucid: the joints very short, not much exceeding the dissepiments in length, and as it appears under the microscope, composed of three granules, which, not having been able to find any other, I conclude are the fructification of the plant.

There is no danger of its being confounded with any other species.

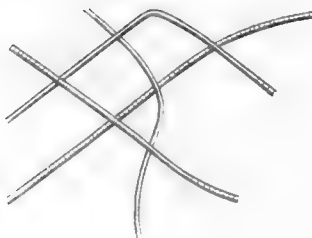
When dried its color becomes rather darker, and in that state it will not adhere to glass or paper.

- A. C. atro-virens, natural size.
B. Ditto magnified 3.
C. Ditto 1.

A



B



Conjuncta decorticans

Del. et lit. M. J. S. 1855

CONFERVA DECORTICANS.

C. filamentis simplicibus, tenuissimis, densissimè contextis, cœruleo-viridescentibus; dissepimentis obscuris; articulis brevibus.

On damp walls and stones not uncommon.

THIS species, which appears hitherto to have escaped observation, is by no means unfrequent on walls and stones much exposed to moisture. I first detected it mixed with *C. muralis*, on the pump facing Stationer's Hall, in London, and since in similar situations in several of the Western counties. It grows in large glaucous patches, so intimately woven as to peel off in flakes, bearing a considerable resemblance to a piece of silk or ribbon: its filaments, which it is impossible to disentangle so as to ascertain their length, are extremely slender, of a deep glaucous color, and some of them are very slender: dissepiments may be observed regularly disposed at distances about equal to the thickness of the filament.

From *C. muralis* it differs in its much greater tenacity, and darker color; from *C. limosa* in the former, and its far different mode of growth; and from both these, and indeed all others, it may be distinguished by its forming patches so densely matted as to peel off in thin strata, as is above described.

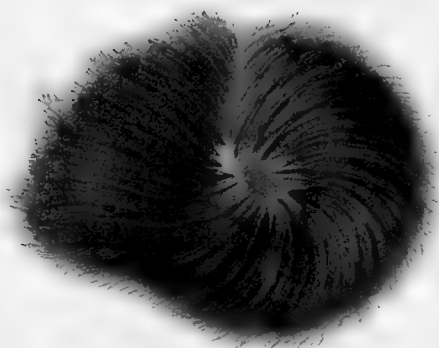
The surface is in general very smooth and glossy; but when the wall on which it grows is occasionally washed by a stronger stream of water than usual, as frequently happens at mills, its filaments are lengthened out, and the surface assumes a more shaggy appearance.

In drying, it does not appear to suffer any change, and adheres to both glass and paper.

A. *C. decorticans*, natural size.

B. Ditto, magnified, 1.





B



C



Conferva comoides

CONFERVA COMOIDES.

C. filamentis tenuibus, ramosis: ramis sparsis, remotiusculis, apice acuminatis: dissepimentis parum contractis, ferè obsoletis.

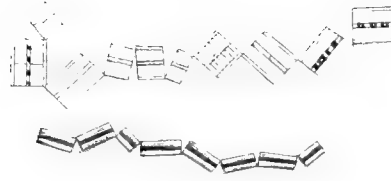
On several of the marine algæ and rocks in the sea at Swansea.

THIS species I believe to be extremely common on our shores, though it appears hitherto to have been entirely overlooked, or perhaps considered as the seedling of *C. littoralis*, to which it bears so great a resemblance that it is not without hesitation I have ventured upon publishing it as distinct; though from repeated observation I have found its characteristic marks so constant, that, if not specifically different, it must at least be allowed to be a most singular variety: and, in the present state of our knowledge of these plants, I conceive nothing more can be expected from any author, nor indeed any thing be done more favourable to the advancement of science, than, by giving faithful figures and descriptions of what we see, to store up materials for future naturalists to work upon. The naked eye may readily distinguish the two plants, by the smaller size of *C. comoides*, which seldom exceeds an inch in length, and its deeper color, either of, or approaching to, a purple brown. Under the microscope their different structure is such, that I hope it will not be possible to confound them. The present species grows on marine stones and algæ, and frequently so covers the round pebbles which abound among the rocks with its slender hair-like tufts, lying one over the other, as to give them a striking resemblance to the head of an infant. The branches are rather irregular, and not so numerous as in *C. littoralis*; but, as in that species, they originate at very acute angles, and are acuminate at their apices. The dissepiments being extremely faint, it is almost impossible to ascertain the size of their joints, but their length always

appears much to exceed their width; as, where contractions occur, which is generally the only mark by which the dissepiments can be discovered, the filaments gradually and slightly diminish for a considerable distance towards them. In drying, this plant changes to a greenish grey color, and adheres both to glass and paper.

- A. *C. comoides*, natural size, growing on a pebble.
- B. Ditto magnified 3.
- C. Ditto Ditto 1.

A



B



D



Conferia glauca

Conferia glauca

CONFERVA FLOCCULOSA.

C. filamentis sub-simplicibus compressis, minutis; dissepimentis solutis;
articulis prismaticis, alternatim refractis.

C. flocculosa. Roth. Cat. Bot. I. p. 192. t. 4. f. 4. & t. 5. f. 6. Fl. Germ. III.
pars 1. p. 523.

In Pools, Ditches, and Slow Streams, adhering to other *Confervæ*, and to decaying vegetables.

THIS singular plant was found for the first time in Britain by my friend Joseph Woods, junr. and myself, growing on decaying vegetables in a pool on Hampstead Heath, since which time I have observed it in various other places. Its structure is so extraordinary, that notwithstanding the figures and descriptions in the *Catalecta Botanica*, and my own repeated observations, I can hardly now allow myself to assign it a place among the perfect productions of nature. I think it best however to submit a figure of it to the Botanical world, and shall be happy to abide by their decision. At first I considered it as *C. pectinalis* broken to pieces, but a little observation rendered that idea inadmissible. It certainly has very much the appearance of a broken plant; but J. Woods, junr. has observed it in a state figured at *C.* in which the joints cannot be so disposed as to make the two parts of the line, which one might otherwise imagine continued originally the whole length of the plant, coincide.

It is a very small species, seldom exceeding one-fourth of an inch in length, and varying in color from a pale to a greenish brown. The filaments are rarely branched; their form is not easily ascertained, but they have always appeared to me to be very much compressed; and the joints, only adhering to one another by single points, look like a string of parallelograms united at the corners. Each joint has a double line running through the middle of it, and some very faint

transversal bands frequently appear; in some cases however, as at B, &c. this line is either entirely wanting, or has escaped the power of my glass.

C. flocculosa is subject to some variations, of which all that have hitherto been observed are noticed in the plate. A. represents the plant as it generally appears, and indeed though I frequently examined, I saw it in no other state for some months, but on the 23d of May, 1802, my above mentioned friend found it in the New River, as represented at B, and he afterwards obligingly communicated a drawing of some that he found varying still more from its general appearance, which is given at D. Its favourite situation is on *C. glomerata*, which about London is seldom to be met with without it.

It adheres well to either glass or paper.

A. *C. flocculosa*, magnified 1.

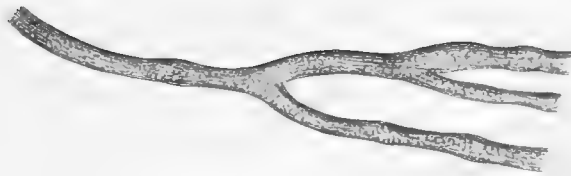
B. C. D. Ditto, ditto 2.



A



B



C



Conifera fluvialis

CONFERVA FLUVIATILIS.

C. filamentis ramosis rigidiusculis; ramis ramulisque subalternis utrinque attenuatis; dissepimentis torosis, verrucosis; articulis longis bifariam dilatatis.

C. fluviatilis. Sp. Plant. p. 1635. Fl. Ang. p. 597. Scot. p. 985. With IV. p. 134. Roth. Cat. Bot. I. p. 201. Fl. Germ. III. pars 1. p. 528.

C. torulosa. Roth. Cat. Bot. I. p. 202. Fl. Germ. III. pars 1. p. 529.

C. fluviatilis nodosa, *fucum æmulans*. Dill. Musc. p. 37. t. 7. f. 4. 8.

C. fluviatilis lubrica, *fetosa*, *equifeti facie*. Dill. Musc. p. 39. t. 7. f. 47.

In rapid and rocky streams, in Yorkshire, Cumberland, and Westmoreland, Hudson. Common in the Western counties of England and in Wales.

C. FLUVIATILIS abounds in most of the rapid rivulets in Wales, and the West of England, growing in large masses, generally of a dull olive color, but sometimes varying to a greenish purple. The root is a small callus, common to several filaments, which are six or eight inches long, irregularly divided and sub-divided into branches and ramuli attenuated at both ends. The principal branches are about the thickness of common twine; but the ultimate ramuli are often as fine as the hair of the human head. Sometimes however its filaments are nearly simple, when they are shorter, thicker, and more rigid than those which are much branched. In this state it is most probably the *C. fluviatilis nodosa*, *fucum æmulans* of Dillenius, and the *C. torulosa* of Dr. Roth; but, as I have observed both appearances on filaments growing from one root, I cannot consider them as distinct species. The dissepiments are swollen, so as to appear very evident to the naked eye, and are generally beset with two, three, or sometimes four hairy tubercles, which are perhaps in some manner connected with the fructification, though no seeds have hitherto been detected in them.

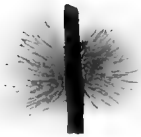
The joints are oblong, narrowest in the middle, and beautifully reticulated with dark colored veins: their length is about equal to eight times their thickness.

Mr. Turner and Mr. Sowerby found near Penzance, a gigantic variety of this plant, extending to two feet in length, and with the joints of its branches quite obsolete.

In drying, the colour becomes darker, and it will adhere slightly to paper, but not at all to glass.

The drawings of *C. fluviatilis* and *gelatinosa*, were executed by Wm. W. Young, an ingenious artist at Swansea.

- A. *C. fluviatilis*, natural size.
- B. Ditto, magnified 4.
- C. Ditto, 2.



Conifera Nana

CONFERVA NANA.

C. filamentis ramosis minutissimis : ramis ramulisque sub-alternis acuminatis ; dissipimentis pellucidis ; articulis cylindricis.

In the Wye, near Llanydloes, in Montgomeryshire, and near Swansea.

THE bottom of the rocky channel of the Wye, near Llanydloes, was on the 9th of last November covered with a soft down, which, on subsequent examination, proved to be the remains of some *Conferva* in decay ; most probably the *Ceramium cæspitosum* of Roth, overgrown with the present extremely delicate parasite. The minuteness of the filaments, which, in length, seldom much exceeded half a line, prevented me from ascertaining their nature so fully as I could have wished. Their color is pale brown, tinged with green, subdiaphanous under the microscope. They appear to consist of a simple stem, beset at uncertain distances with alternate branches, which are again clothed with short, simple, solitary ramuli, placed at small distances from each other, most commonly alternate, though sometimes two or more together are disposed on the same side ; all of them are finely acuminate : the dissipiments are very apparent, and divide the filaments into joints, all of equal size, of which the length is about double the thickness. To the naked eye, this plant, like some of the most common species, appears, when taken from the water, like a mere mass of decaying vegetable matter ; its extreme minuteness might fairly induce a suspicion whether it is in reality any thing more than the seedling of some known *Conferva* ; and under this idea I should have been unwilling to publish it as a new one, but that its ramification, and remarkably acuminate branches, render it quite unlike any other, with which I am acquainted, except *C. littoralis*, which is one of our largest species ; and which, it may therefore fairly be presumed, would not be so perfectly formed in so very minute a state. It adheres to either glass or paper.

- A. *C. nana*, natural size.
- B. Ditto, magnified 3.
- C. Ditto, 2.
- D. Ditto, 1



B



D



C



Conferia littoralis

CONFERVA LITTORALIS.

Conferva filamentis ramosissimis tenuissimis flexuosis densè implexis ; ramis ramulisque acuminatis : dissepimentis obscuris ; articulis cylindricis brevibus.

C. littoralis. Sp. Pl. p. 1634. Fl. Ang. p. 594. Fl. Scot. p. 979. With. IV. p. 130. Cat. Bot. I. p. 152.

Conferva marina capillacea longa ramosissima mollis. Dill. Hist. Musc. p. 23. t. 4. f. 19.

On Rocks and Fuci in the Sea, common.

THIS species abounds on all the coasts I have yet examined, growing either on the rocks or larger fuci, particularly *Fucus vesiculosus*. Its filaments, which are peculiarly thin, form oblong fasciculi, of a dull olive-green color, occasionally more or less tinged with yellow ; and varying in length from six to nine inches : they are much branched, and so slender and flexible as to be affected by the slightest motion of the water. Their substance is tender and soft, but still by no means inclining to gelatinous. Their mode of growth is so entangled, that it is almost impossible to separate them. In their native situation they have a remarkably elegant appearance, being twisted together so as to look like thick shoots, the edges of which are, from the young branches, feathered in a most beautiful manner. The branches are generally alternate, but sometimes opposite, and issue from the stem at acute angles. They are always remarkable for their acuminate apices, upon which, and the shortness of the joints, the strongest characters of this plant depend. The dissepiments are nearly black, often appearing broken, and dividing the filaments into short joints ; which, as in *C. fracta* and some other species, are frequently swollen, and then assume a darker color. Some specimens

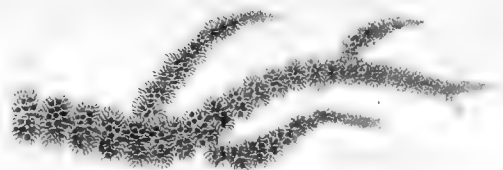
I gathered last spring in the river Yare at Yarmouth, from which the drawing at D was made, produced numerous globular capsules, scattered irregularly on the branches. In drying, the color of this plant becomes somewhat darker, and it adheres, though not very firmly, to both glass and paper.

- A. *C. littoralis*, natural size.
- B. Ditto, magnified 4.
- C. Ditto ditto, 1.
- D. Small piece of do. in fruit. 2.

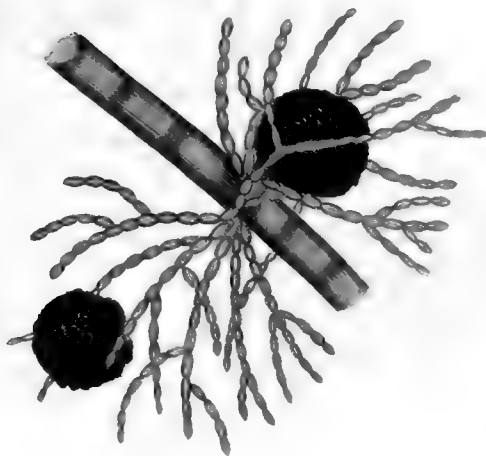
A



B



C



Cenferia gelatinosa

Collected by W. C. Cullen June 1883

CONFERVA GELATINOSA.

C. filamentis ramosissimis moniliformibus lubricis; ramulis tenuissimis, penicilliformibus, sub-verticillatis, ramosis fructiferis; dissepimentis obscuris; articulis breviusculis; capsulis sub rotundis polyspermis

C. gelatinosa. Lin. Sp. Plant. p. 1635. Fl. Ang. p. 597. Fl. Scot. p. 986. With. IV. p. 134. Eng. Bot. t. 689.

Chara batrachosperma. Weis Gott. p. 33. t. 1.

Chara gelatinosa. Roth. Cat. Bot. I. p. 126.

Batrachospermum moniliforme. Roth. Fl. Germ. III. pars 1. p. 480. Cat. Bot. II. p. 187.

Conferva fontana nodosa, spermatis ranarum instar lubrica major and fusca. Dill. Musc. p. 36. t. 7. f. 42. Ray Syn. p. 62.

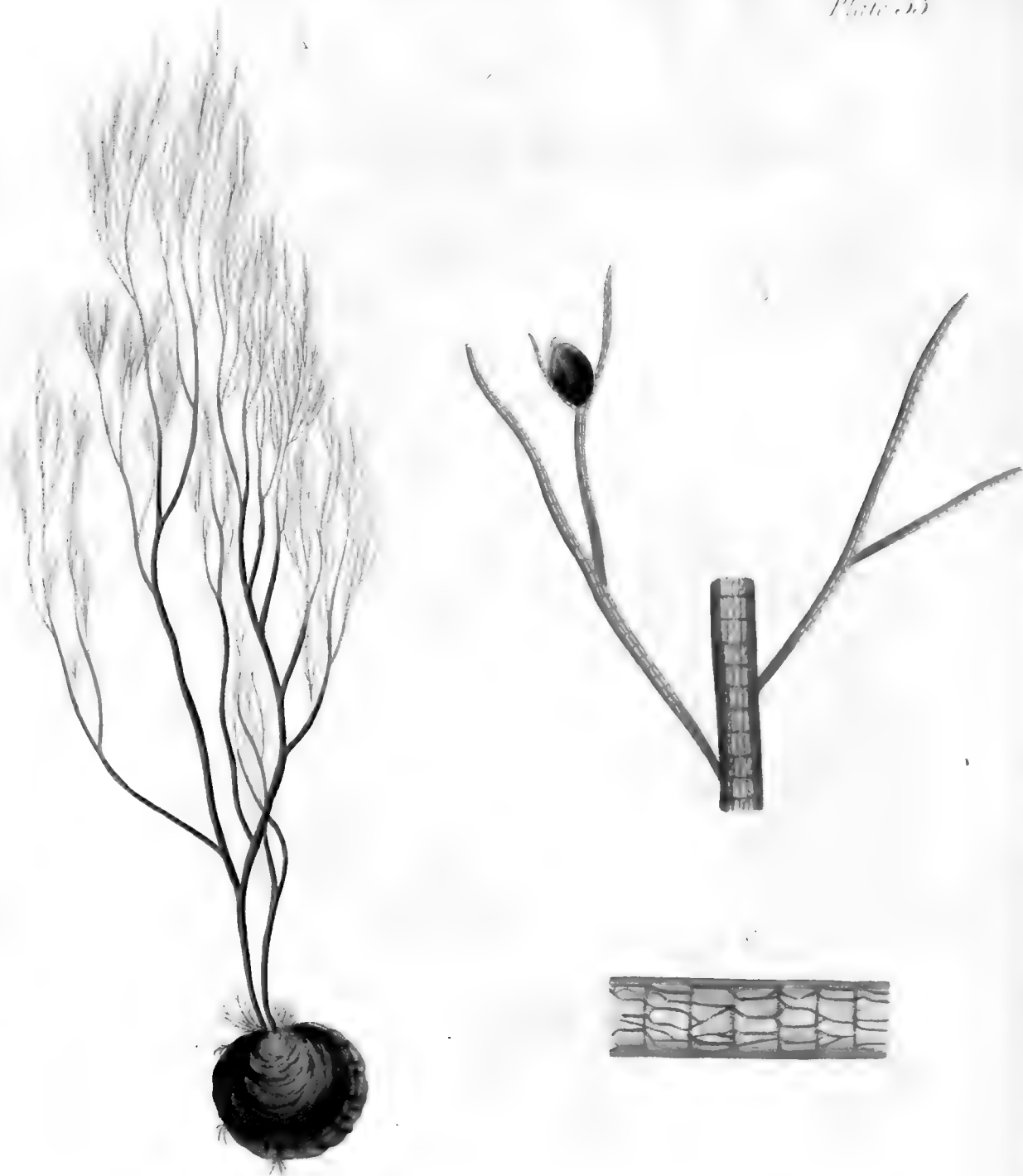
Common in clear streams.

IN the description of *C. mutabilis* it is remarked, that two out of the five plants which Linnæus united under this name, are certainly distinct, and that the remaining three exhibit little other difference than that of size of color. Observations since made by D. Turner, Esq. and Joseph Woods, junr. on the Herbarium of Dillenius, prove that his No. 43, is marked only by its smaller size, and hardly deserves to be considered a variety, and some specimens gathered last summer by D. Turner, in Lyn Fynnon Velan, an Alpine Lake on Snowdon, leave it very doubtful whether 45 is not really a distinct species, its stems being quite hard, and its moniliform appearance very faint; so that I think it best to defer mentioning it till it shall fall more immediately under my own inspection in a recent state.

The root of this species is a black callus, the shoots are numerous, and when taken from the water collapse together, so as to form a shapeless mass, bearing a striking resemblance to frog's spawn, and so slippery, that the fingers can with difficulty hold it. It varies in length from one to six inches, and in color, from a dark purple to a blackish or yellowish green. When expanded in water the filaments are seen to be repeatedly branched, the branches disposed without any regular order, and beaded in a very elegant manner. Under the microscope these beads appear to be formed by ramuli either opposite or verticillate, repeatedly divided and subdivided into extremely short and slender patent branchlets of nearly equal lengths; among them, at, I believe, every season of the year, fructification may be found consisting of minute globular blackish capsules, which, when highly magnified, may be observed to be composed of an immense number of grains. On this account principally Dr. Roth has made it a new genus under the name of *Batracho-spermum*, but, as already remarked in English Botany, the fruit of all the marine *Confervæ* is a polyspermous capsule. Weis, as above quoted, has referred this plant to the *Charæ*, a tribe of plants most strikingly connected with the *Confervæ*.

In drying, it changes but little, and will adhere firmly to either glass or paper.

- A. C. Gelatinosa, natural size.
- B. Ditto, magnified 4.
- C. Ditto, ditto 1.



Conferva elongata

Collected by J. H. Lamour.

CONFERVA ELONGATA.

C. filamentis ramosissimis cartilagineis; ramis ramulisque elongatis, diffusis, fetaceis, venosis; dissepimentis obscuris articulis brevissimis, capsulis ovatis sessilibus.

C. elongata. Fl. Ang. p. 599. With. IV. p. 137.

Fucus diffusus. Fl. Ang. p. 589. Lin. Transf. III. p. 197.

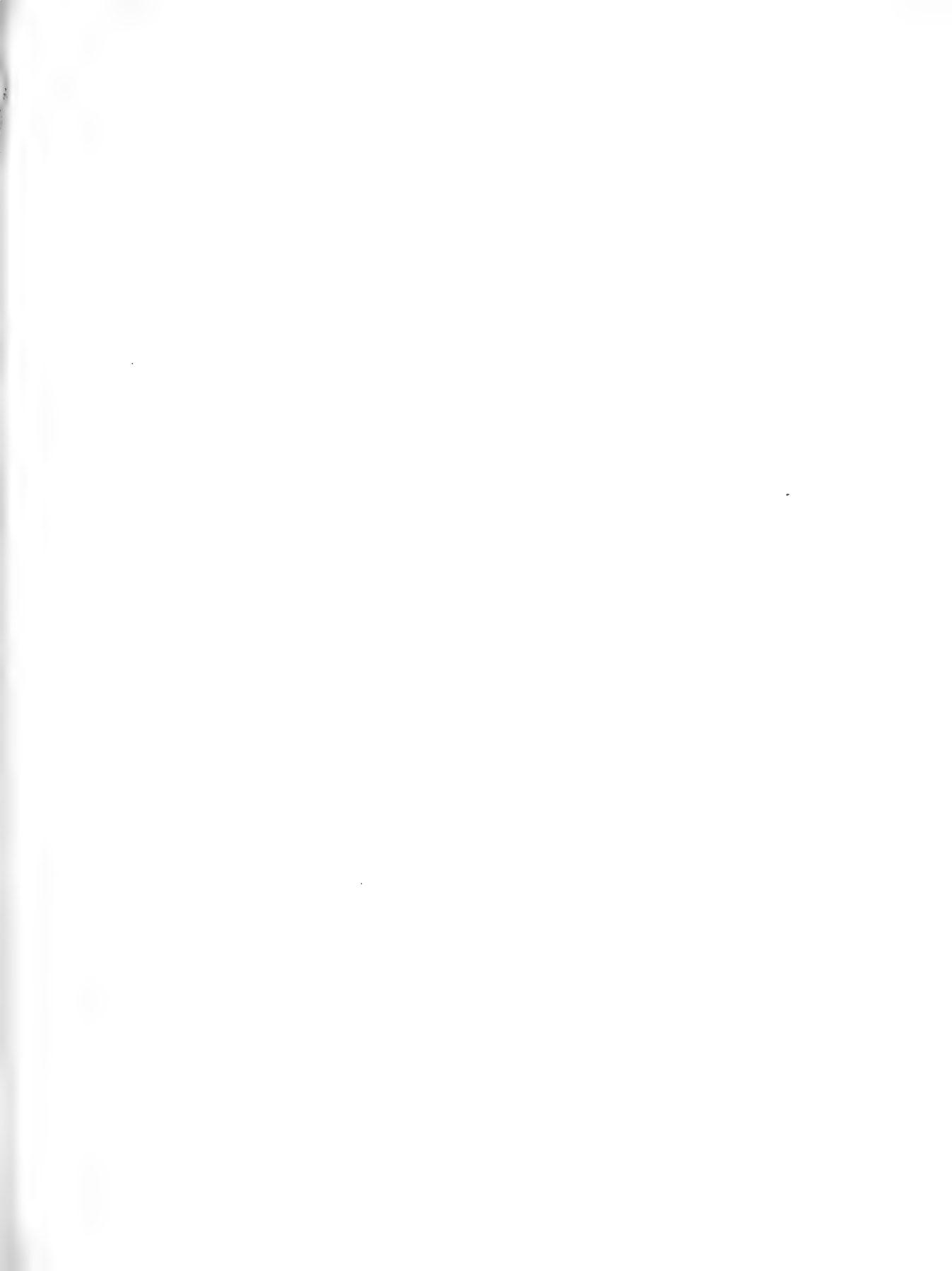
On Rocks in the Sea, common.

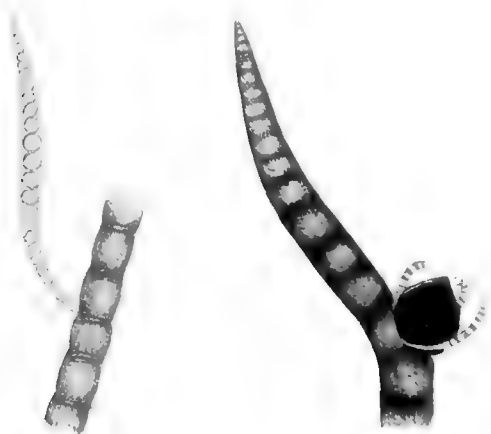
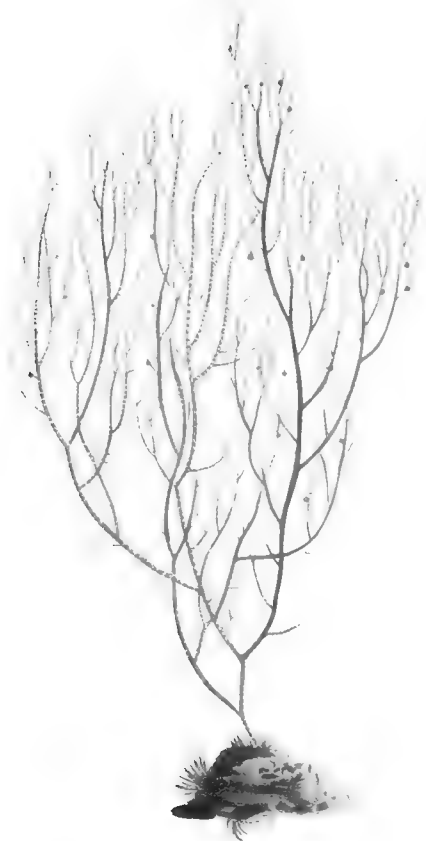
C. ELONGATA, which in size exceeds every other British *Confervæ*, is extremely common on most if not all our shores, and I have frequently seen it adhering to oysters in the London markets. It has been often, and not uncommonly, called the Lobster-horn *Conferva*. Its root is an expanded callus; the frond in general solitary; the main stem is as thick as common twine, and of a more cartilaginous and firm texture than in any other species. The branches and ramuli are fetaceous, long, diffuse, and elegantly veined; under the higher powers of the microscope the veins present a very remarkable appearance, being filled with a fluid, which, in drying, collapses towards the middle, precisely as represented in the magnified filaments of *Conferva glomerata* (tab. 13.); and in them a few dissepiments may be here and there observed, dividing them at uncertain and irregular distances. The larger of these veins, or rather perhaps those which are disposed on the surface, anastomose at the dissepiments, as if they were the origin of them, but a little observation shews that they are quite independent of each other. The dissepiments are of a darker color than the rest of the filaments; the joints are very short, being seldom more in length than half their breadth. The capsules, found in the Months of July and August, are scattered rather sparingly on the ultimate branches; they are ovate, sessile, and in nature exactly resemble those of *C.*

coccinea; but besides them, *C. elongata*, in the early months of the spring, as mentioned in the Synopsis of British Fuci, p. 355. is sometimes covered with capfuls similar to those of *Fucus subfuscus*, with which plant and *F. pinastroides* it has, in point of general habit, so strong a resemblance, that they cannot be separated without violence. Hudson, by twice introducing this species under different names in the Flora Anglica, has been the cause of great confusion.

In drying, it assumes a darker color, and adheres very slightly to paper, and not at all to glass.

- A. *C. elongata*, natural size.
- B. Ditto magnified 3.
- C. Small piece of Ditto 1.





Corymba rubra

CONFERVÆ RUBRÆ.

C. filamentis ramosissimis; ramulis setaceis, apicibus furcatis; dissepimentis parum contractis; articulis in medio pellucidis; capsulis subglobosis lateralibus.

C. rubra. Fl. Ang. p. 600. With. IV. p. 138. Eng. Bot. t. 1166.

C. nodulosa. Fl. Scot. p. 944.

Ceramium virgatum. Roth, Cat. Bot. I. p. 148. t. 8. f. 1. (excl. fyn. Hudf.)
Fl. Germ. III. pars. 1. p. 461.

C. geniculata, ramosissima lubrica longis sparsive ramulis. Dill. Musc. p. 35.
t. 6. f. 38. A. Raii Syn. p. 61.

On Rocks and Stones in the Sea, common.

IT is much to be regretted that Linnæus did not preserve specimens in his Herbarium of the few *Confervæ* which he has described. From the size and beauty of the present species, added to its great abundance on every shore, it appears almost impossible that it should have wholly escaped his attention; but no description or reference is to be found in his works, which at all correspond with it. The author who first gave it the trivial name by which it is now generally known was Hudson; he refers to the number above quoted of the *Historia Muscorum*, but Dillenius, as was conjectured in the *Catalecta Botanica*, has confounded two plants under that head; the first of which, as appears by the Herbarium, is the present species; the latter, according to the observations of my friends Dawson Turner and Joseph Woods, jun. is *Fucus subfuscus*.

C. rubra often grows to the length of 18 or 20 inches, and varies from a dark to a light red or purple color, which is very liable to bleach. The root is a small

callus, from which arise one or more filaments about the size of sewing silk, and repeatedly divided without any regular order, though most frequently in a dichotomous manner; the ramuli are fetaceous; the dissepiments of a dark red, and mostly more or less contracted; the joints beautifully reticulated, and pellucid towards the center. The capsules are sessile and lateral, more round than those of *C. coccinea*, but are precisely of the same nature, as are also the seeds, except that when they issue from the capsule, much less of the gelatinous pulp attends them. Each capsule is subtended generally by one, but sometimes, as in my figure, by three subulate ramuli, which I apprehend may be considered as a kind of calyx; their nature I hope hereafter to be able further to elucidate.

It frequently happens that the joints in some of the older specimens swell, and thereby assume a more beaded appearance than in their usual state. This has been, though erroneously, as is shewn under *C. diaphana*, regarded as the *C. nodulosa* of Hudson, and botanists have puzzled themselves in endeavouring to find specific distinctions between the same plant in different stages of growth. Dr. Roth has erred in quoting as a synonym of this species, though with a mark of doubt, the *C. fucoidea* of the *Flora Anglica*, which is extremely dissimilar.

It adheres but slightly to paper, and not at all to glass.

A. *C. rubra*, natural size.

B. Ditto magnified 3.



B



C



Conferva aurea

—Published by J. M. Delucq. Nov. 1863

Exon. 1863

CONFERVA AUREA.

C. filamentis ramosis aureis minutis; ramis longis patentibus rigidiusculis sub incurvis; dissepimentis pellucidis; articulis longiusculis.

Byssus aurea. Sp. Plant. p. 1638. Fl. Ang. p. 606. Fl. Scot. p. 1002. With. IV. p. 144. Eng. Bot. t. 212.

Byssus petræa crocea glomerulis lanuginosis. Dill. Musc. p. 8. t. 1. f. 16.

Byssus aureus Derbientis humifusus. Raii Syn. p. 56.

In moist places, generally in a lime-stone soil, frequently growing on Musci: not very common.

WHATEVER claim the plants generally known by the name of *Byssi* have to be considered a separate genus, the present species cannot justly be ranked among them. *Byssi* are defined by Linnæus and subsequent botanists as consisting of simple down or powder. Dr. Roth considers them as solid substances with the seeds scattered on the outside, but this plant so little corresponds with either, and has so strikingly the structure of a *Conferva*, that I am surprized it has not been already referred to that tribe, instead of being carried, as it has been by Dr. Acharius, to the Lichens, with which it has little affinity.

C. aurea occurs, though but rarely, in damp situations on calcareous rocks, and in chalk pits, frequently forming irregular cushion-like tufts on some of the musci; and when it grows in large patches, bears a striking resemblance, as Dr. Smith observes, to a piece of orange-coloured cloth or velvet, and is a very conspicuous and beautiful object. Even without the aid of a microscope, the filaments may be seen to be much branched; the branches are long, disposed without any regular order, patent, mostly somewhat incurved, and divided into



Conferva villosa

CONFERTA VILLOSA.

C. filamentis ramosis ; ramis ramulisque oppositis distantibus ; articulis brevissimis ; dissepimentis obscuris villosis.

C. villosa. Fl. Ang. p. 603. With. IV. p. 141. Eng. Bot. t. 546.

On submarine Rocks and Stones. In Cornwall, *Hudson*. At Yarmouth, *Darwin Turner, Esq.* On the Rocks at the Mumbles, near Swansea.

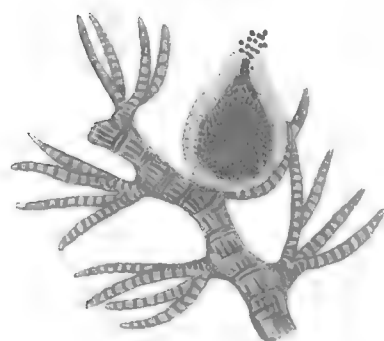
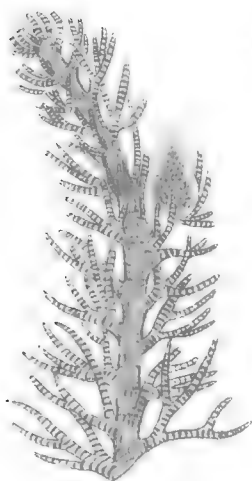
C. VILLOSA appears to have been first observed by the indefatigable author of the Flora Anglica, and may be reckoned among the most unfrequent of this tribe, being found but in few parts of the kingdom, and not having been noticed by any foreign writer. Its growth seems to be very rapid, and its duration short, as it has, I believe, never been found but in the months of July and August.

The whole plant is of a greenish yellow color, and of a cartilaginous nature, but becomes soft and very flaccid soon after it is gathered. The root is a small callus. The stem varies from six inches to three feet or more in length ; is considerably thicker than horse hair, and seldom more than thrice divided. The branches are distant, mostly opposite, and undivided when not more than two inches in length ; the hairs, which constitute the leading specific character, are disposed in whirls on about every 4th or 5th joint, and mostly subdivided in a similar manner, giving the plant a remarkably hairy appearance, as if beset with some minute parasite ; these hairs are extremely slender, and so liable to be broken off, that it is almost impossible to find a specimen in which they are nearly all perfect. The dissepiments are disposed at equal and very short distances from each other ; they are not readily discoverable except in the verticillated hairs, to which when the juices have collapsed, as is most commonly the case, they give a very beautiful appearance.

In drying, its color becomes more green, and it adheres to both glass and paper.

A. *C. villosa*, natural size.

B. Ditto magnified 2.



Conifera coccinea

Published by W. H. & Co. New York

CONFERVA COCCINEA.

C. filamentis sub-cartilagineis ramosissimis, hirsutis; ramis decompositopinnatis; pinnis alternis; pinnulis ultimis fasciculatis pennicilliformibus; dissepimentis obscuris; articulis brevibus; capsulis ovatis.

C. coccinea. Fl. Ang. p. 603. With. IV. p. 140. Eng. Bot. t. 1055.

C. plumosa. Ellis in Philosophical Transactions LVII. p. 425. t. 18. f. c. c. d., D. Fl. Scot. p. 996.

Ceramium hirsutum. Roth, Cat. Bot. II. p. 169. t. 4.

Mucus marinus purpureus parvus, foliis oblongis mille-folii fere divisurâ. Raii Hist. p. 79. n. 25.

On Rocks and Stones in the Sea, common.

FEW marine productions exceed the present species in beauty or frequent occurrence, and none meets with more general admiration, or is more frequently gathered and used in ornamental devices by the female visitors on our shores. The root is a small callus, the frond solitary, the main stem nearly as thick as common twine, mostly of a darker red than the branches, and of a more uneven and hairy surface. The primary shoots are disposed without any regular order, of unequal lengths, and beautifully winged with alternate branches, which are pinnated with others, also alternate, and again divided into ramuli, issuing so nearly together as to give them a pencil-like appearance. The dissepiments can scarcely be perceived in the main stem or primary branches, but are very apparent in the lesser ones, and divide them into short pellucid joints. The capsules, which are sessile and of an oblong ovate form, appear in the Spring, in the earliest parts of which they are of a light red, becoming gradually darker, and in May

the internal structure, as represented at C. may be observed; the capsule, which is rather thick, contains a number of dark red seeds, immersed in a clear gelatinous pulp, part of which issues with them, when ripe, through an aperture, formed by the bursting of the apex of the capsule. Not having been able to observe the dioecious fructification mentioned by Lightfoot, I am inclined to think that the plants which he supposed to be male and female, differed only in age. In June the capsules have generally shed their seeds, and during that month this plant is found lying in great abundance on the shore; this circumstance may probably be accounted for by reflecting that the roots instead of inhering into the substances to which they adhere for the purpose of absorbing nourishment, merely grasp the rocks for the sake of support, and it seems probable that when they have fructified, and their vigor begins to decline, they are no longer able to maintain their grasp, and therefore instead of decaying on their native spot, as is the case with land plants, easily yield to the pressure of the tide, and are washed away to rot, or offer their services to man on the shore. Several observations I made at Dover tend to strengthen this position, which serves also to account for the sudden disappearance of the marine algæ mentioned in the Introduction to the Synopsis of the British Fuci, and confirmed by the experience of my friend the Rev. J. Lyons and numerous other marine botanists.

For reasons given in my friend D. Turner's Synopsis above mentioned, p. 295. Ray's Synopsis cannot be here referred to. In drying, this plant undergoes but little change; it adheres to paper, but not at all to glass.

- A. C. coccinea, natural size.
- B. ditto magnified 3.
- C. ditto ditto 2.





Conferia duplirana

Conferia duplirana (H. J. P. de la Chapelle)

CONFERVA DIAPHANA.

C. filamentis ramosissimis; ramulis apice forcipatis; dissepimentis obsoletis; articulis utrinque torosis, medio pellucidis; capsulis subglobosis lateralibus.

C. diaphana. Fl. Dan. t. 951. Fl. Scot. p. 996. With. IV. p. 139. Fl. Germ. III. pars. 1. p. 525. Cat. Bot. II. p. 226.

C. nodulosa. Fl. Ang. p. 600.

C. marina nodosa lubrica, ramosissima, et elegantissima rubens. Dill. Musc. p. 35. t. 6. f. 38. A. Raii Syn. p. 62. t. 2. f. 3.

Rocks, Stones, and Fuci, in the Sea, frequent.

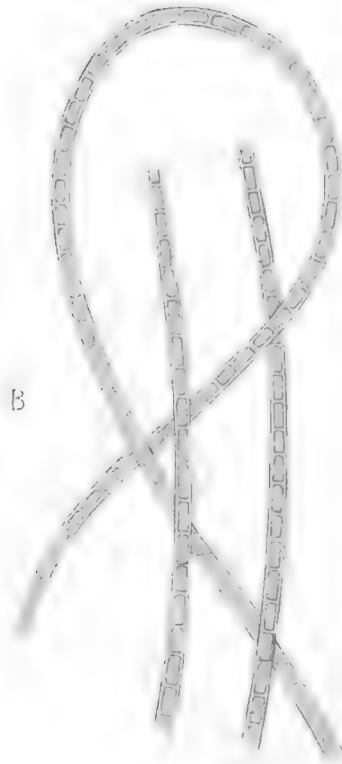
THIS Species, which is not an uncommon ornament of nearly every shore, is in beauty surpassed by few, presenting to the naked eye the appearance of a series of small beads alternately colored and pellucid. It varies from 2 to 6 inches in length, and in color through all the intermediate gradations between a reddish brown and dark purple. The root, as in most other marine species, is a small callus, from which several bushy filaments proceed; these are repeatedly branched; the branches dispersed without any regular order, but most frequently dichotomous, and subdivided into ramuli, which are forked at the apices; the forks approaching each other in a forceps-like manner, though not so strikingly as in *C. ciliata*. The dissepiments are obsolete, but the joints are swollen at each end, and of a deep red color, occasioned by reticulated veins, similar to those which cover the whole joint of *C. rubra*, but which, in this species, leave the middle perfectly colorless and transparent. The capsules are nearly round, lateral, sessile, and often surrounded by 4 or 5 short incurved ramuli.

The following argument, used by my friend Dawson Turner, to prove that *C. nodulosa* of the *Flora Anglica* should be made a synonym of this species, appears to me so conclusive, that I have adopted it without hesitation. "It has been supposed that Mr. Lightfoot was the first botanical author who noticed this species. A supposition that seems justified from his making no reference to Dillenius, and from his *C. diaphana* being introduced as a new plant in the Appendix to the *Flora Anglica*. This idea is however very erroneous, for from the Dillenian Herbarium, in which good specimens are preserved, it is clear that this is the No. 40 of the *Historia Muscorum*, and consequently the *C. nodulosa* of Hudson, by the admission of which, a great deal of confusion, with respect to references, is done away, and a plant that has always been considered one of the most doubtful among botanists is clearly established." The specimen corresponding with No. 41, to which Hudson refers as his *C. purpurascens*, is a small variety of this species, but Hudson's description is so short that it will equally apply to many other species.

It adheres but slightly to either glass or paper.

A. *C. diaphana*, natural size.

B. Ditto, magnified 2.



Conferva regularis

Collected by J. H. S. Hargrave

1861

Printed by J. H. S. Hargrave

CONFERVA RIVULARIS.

C. filamentis simplicibus, atro-viridibus, tenuibus, longissimis densissimè compactis, plerumque contortis; articulis breviusculis.

C. rivularis. S. Plant, p. 1633. Fl. Ang. p. 591. Fl. Scot. p. 975. With IV. p. 127.

C. compacta. Roth. Fl. Germ. III. pars. 1. p. 497. Cat. Bot. I. p. 170.

C. fluviatilis sericea, vulgaris & fluitans. Dill. Musc. p. 12. t. 2. f. 1.

C. Plinii. Ray Syn. p. 58.

In slow streams and ditches—common.

AT a time when so much doubt prevails among Botanists, on what Dillenius intended by his *C. fluviatilis sericea vulgaris & fluitans*, which all other authors have referred to as their *C. rivularis*, it is with some hesitation that I venture to publish the present plant as that species. The following reasons, however, appear to me sufficiently strong fully to justify this step.—First. It is certain that the plant intended by Dillenius is some very common unbranched species, which grows to a remarkably great length, and has a silky appearance. In these particulars the present species most strikingly corresponds, which is not the case with any other plant.—Secondly. In the Dillenian Herbarium, which I have recently examined, the plant immediately referred to as his ‘t. 2. f. 1.’ is a specimen of *C. spiralis*, which from his description he appears to have confounded with it, attributing the difference of its appearance to its growth in stagnant water.* There is also a specimen of the plant here figured, under the name of *C. madraspatana*; and among the synonyms and remarks on his *C. fluviatilis sericea vulgaris & fluitans*, we find the following: “*Conf. madraspatana, Allocopaphy Malaba-*

* “*In aquis vero stagnantibus, quas quandoque intrat, brevior est & lati expansa cernitur.*” Dill. Musc. p. 12.

rorum, Pluk, Almath. p. 63, quam meolim in ipsius Herbario sicco vidisse memini, & cujus specimen etiam habeo, non differt a vulgari hac."

I must allow that there are also two specimens of the present plant in the Herbarium, under the name of *C. palustris bombycina*, to which subsequent authors have referred as their *C. bullofa*; but neither Dillenius's figure or description of that species agree at all with this plant, and this inaccuracy is by no means surprising when we reflect that Dillenius did not use a microscope, and that his *C. palustris bombycina* contains all those *Confervæ*, which generate and retain among their filaments a sufficiency of air to raise them up, and enable them to float on the surface of the water, as is frequently the case with the present species.

C. rivularis grows in very compact silky slender masses, of a dark green color, frequently carried out to the length of two or three feet, and twisted by the action of the stream. The filaments are simple and slender, of a uniform color, and divided into short joints, which sometimes appear filled with granules, that most probably are the fructification of the plant, no other having been discovered.

In very shady clear streams I have several times found a plant approaching the present species in many particulars, but differing in being furnished with numerous short spine-like branches, three or four of which mostly issue from the same dissepiment, and some being erect, and some reflected, present a curious appearance. Dr. Roth, and Professor Mertens, in a letter to my friend Dawson Turner, express their opinion that it is but a variety of this species; but the above-mentioned, and some other more trifling differences, are so striking, that with great deference to their experience in this tribe, I conceive that publishing them as distinct will be the most certain way to avoid all future confusion.

The ancients attributed to it the power of uniting fractured bones, by binding it on the fracture, and keeping it constantly moistened with water. See Plin. Hist. Nat. Book 27. Chap. 9.

It adheres firmly to either glass or paper.

- A. *C. rivularis*, natural size.
- B. Ditto, magnified 1.



A



B



C

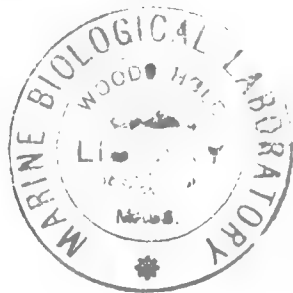
Conifera stricta

CONFERVA STRICTA.

C. filamentis sub dichotomis fasciculatis venosis; articulis longis.

On rocks in the sea at Dover and Swansea.

THE first time I found this species was on the rocks near Archliff Fort, Dover, in 1799, but it had for many years before been gathered by M. Wigg, on the coast at Yarmouth, whence a specimen of it was communicated by D. Turner to his learned friend Professor Mertens, who gave it the name of *C. stricta*. It grows in thick bundles, seldom more than three inches in length, of a dull crimson color. Many filaments rise from the same root, in thickness about equal to the hair of the human head, and repeatedly divided and subdivided into branches and ramuli, for the most part alternate. Under the higher powers of the microscope, the filaments appear as if composed of a number of longitudinal cylindric tubes, divided by dark dissepiments at equal distances, and at the same part of the filament, and appearances make it highly probable that the filaments in this and some other marine species have no general dissepiment, but that the transverse line agreeing at first sight with those of *C. glomerata*, is in fact an aggregation of the dissepiments of the before-mentioned cylindric tubes; and the tubes, especially in the young and ultimate ramuli, are more or less spiral. The joints in length are about equal to thrice their thickness. There is no danger of confounding this with any other species; it approaches nearest to *C. setacea*, but its more brilliant color, larger size, and far longer joints, at once distinguish that species.



In drying its color undergoes no change. It adheres firmly to paper, and slightly to glass.

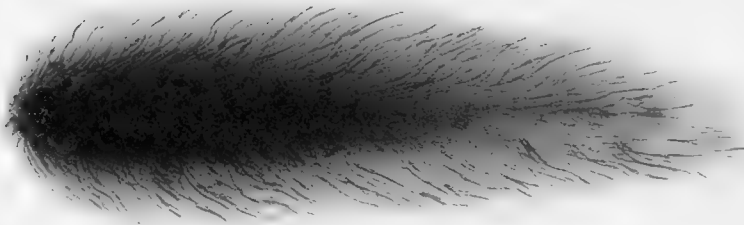
A. *C. stricta*, natural size.

B. Ditto, magnified 4.

C. Ditto, ditto 1.



A



B



C

Coniaria amplibia

CONFERVA AMPHIBIA.

C. filamentis sub-articulatis, ramosis densissime implexis; ramis patentibus remotis; ramulis exsiccatione coeuntibus in aculeos; dissepimentis parum contractis, capsulis sessilibus, sub ellipticis.

C. amphibia. Sp. Pl. p. 1634. Fl. Ang. p. 954. Fl. Scot. p. 979. Withering, IV. p. 129. Roth, Fl. Germ. III. p. 1. n. 7. Cat. Bot. I. p. 16. II. p. 192.

C. amphibia fibrillosa & spongiosa. Dill. Hist. Musc. p. 22. t. 4. fig. 17. B & C. *β. ramis elongatis.*

C. furcata β. Fl. Ang. p. 592. Withering, IV. p. 128.

Ceramium coespitosum. Roth, Fl. Germ. III. p. 1. p. 475. Cat. Bot. I. p. 154. II. p. 186.

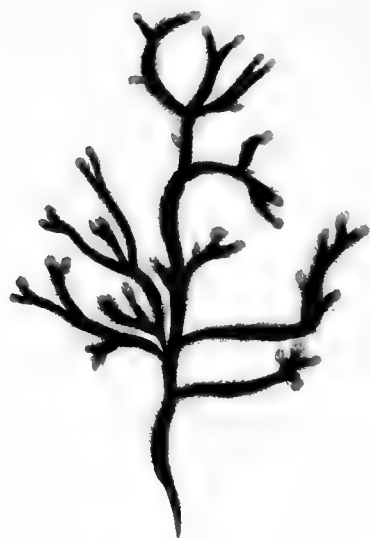
Conferva palustris filamentis brevioribus & crassioribus. Dill. Musc. p. 17. t. 3. f. 10.

C. palustris sub hirsuta filamentis brevioribus & crassioribus. Ray. Syn. p. 447.

In small pools and shallow waters. *β.* in streams and deep waters.

AMONG flowering plants we find several instances of striking varieties produced by the more or less watery situation in which individuals chance to grow, and perhaps no Botanist would acknowledge the two most opposite varieties of *Myofotis scorpioides*, or *Lotus corniculatus*, to be the same species, without an opportunity of tracing them through their several gradations. The same may be said of the present plant, which has hitherto formed two species, and it is only after a careful examination that I have here arranged them as one.

On the edges of ditches, and in similar situations, it frequently occurs in masses, so densely matted as to hold water like a sponge, with its surface beset by erect branches, which give it a very bristly appearance. In this state it is well known to Botanists as the *C. amphibia* of all modern authors. Its hue is a bright green, becoming ash-colored with age. The root I have not been able to dis-



A



B



C

Conserva spongiosa

CONFERRA SPONGIOSA.

C. filamentis ramosis ; ramulis brevissimis simplicibus undique imbricatis ; articulis brevibus ; capsulis oblongis pedicellatis.

C. spongiosa. Fl. Ang. p. 596. Fl. Scot. p. 983. With. IV. p. 132. Roth, in Schrader's Journal, part II. 1800.

Fucus hirsutus. Lin. Mant. p. 134.

F. teretifolius spongiosus pilosissimus. Ray Syn. p. 46.

Muscus marinus hirsutus ; flagellis longis ramosis sub viridibus. Hist. Ox. III. p. 650. Sect. 15. l. 9. f. 6.

Rocks in the sea, not uncommon.

C. spongiosa is not uncommon on our shores, and is particularly abundant on the rocks at Cromer, Ilfracombe, and Swansea. It seldom exceeds three inches in length, and varies from a very dark to a lighter olive color. The root is a callus, from which several irregularly branched stems arise ; the stems and branches are closely imbricated with short, simple, rigid, hair-like ramuli, disposed without any apparent order. In these ramuli short joints are readily discoverable with the assistance of a microscope. The capsules are smaller, and placed on longer footstalks than in any species heretofore described : they generally abound on the ramuli, and are frequently, though not constantly, opposite. The seeds are discharged as described under *C. coccinea*.

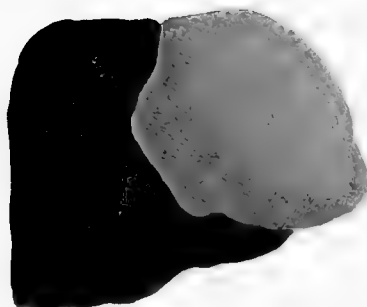
Relying on the rough and spongy appearance of the present species, and *C. verticillata*, Hudson seems to have had no idea of separating them, and we are indebted to the learned author of the Flora Scotica for first ascertaining their

difference. In the former the hair-like ramuli are simple, straight, and disposed without order; in the latter forked, incurved, and regularly verticillate.

In drying it changes to a darker color, and adheres to neither glass or paper.

- A. *C. spongiosa*, natural size.
- B. Ditto, magnified 4.
- C. One of the ramuli of ditto, magnified 1.





A



B

Conserca purpurea

CONFERVA PURPUREA.

C. filamentis dichotomis flexilibus minutis; dichotomiis approximatis; dissepimentis obscuris; articulis longiusculis.

Byffus purpurea. Fl. Scot. p. 1000. Eng. Bot. t. 192. With III. p. 144.

Byffus rubra. Fl. Ang. p. 605.

On rocks and stones, especially such as are near the Sea. Upon the base of the Abbot Mackinnons Tomb, in the ruined Abbey of Y. Columb-kill, *Lightfoot*. Near Aber, in Anglesea, *Rev. Hugh Davies*. In the Cavern under the Light-house on the Mumble rocks, and other similar places near Swansea.

THE structure of the present species agrees so fully with that of *C. aurea*, that the reasons already given for the introduction of the one among the *Conservæ* apply equally to the other, and need not therefore be here repeated.

Few of the minute productions of nature have a more elegant effect than *C. purpurea*. At the end of the cave above mentioned, it so entirely clothes some large rocks that they appear as if covered with the most beautiful crimson or purple velvet; indeed the similarity of appearance between this plant and velvet is wonderfully striking, and far more so than in *C. aurea*, which may rather be said to resemble orange-colored or scarlet plush.

C. purpurea consists of extremely short flexile filaments, so densely matted as to form an uniform mass, resembling the crust of a lichen. The color varies from a purplish crimson to a darkish purple. Under the microscope the filaments are seen to be repeatedly dichotomous at short intervals, with dark colored dissepiments, dividing them into joints, whose length considerably exceeds their thickness. I have not been able to find any fructification.

In dying it becomes crisp, and of a darker color than when fresh, and will not adhere to either glass or paper.

A. *C. purpurea*, natural size.

B. Ditto, magnified 1.



A



B

Conferva polymorpha

CONFERVA POLYMORPHA.

C. filamentis dichotomis fastigiatis sub-cartilagineis, articulis brevibus, capsulis in ramulis superioribus, ovatis, sessilibus.

C. polymorpha. Sp. Pl. p. 1636. Fl. Ang. p. 599. Fl. Scot. p. 989. With III. p. 138. Ellis in Phil. Transf. LVII. p. 425. t. 18.

Ceramium fastigiatum. Roth. Fl. Germ. III. pars. 1. p. 463. Cat. Bot. II. p. 175.

Conferva marina geniculata nigra palmata. Dill. Musc. p. 32. t. 6. f. 35.

Conferva marina geniculata ramosissima lubrica, brevibus & palmatim congestis ramulis. Ray Syn. p. 61.

In the Sea, on *Fucus nodosus*, common.

NO *Conferva* is more common or has been longer or better understood than *C. polymorpha*. It grows parasitically on some of the larger *Fuci*, but most commonly on *Fucus nodosus*, forming thick tufts, about two or three inches in length. The color when young is a dark purple, but changes with age, or when dry, to black. The root is a callus, which is so small, and in color so precisely resembles the *Fuci* to which it adheres, that it is difficult to distinguish it. It appears to me to throw out extremely short creepers, the ends of which adhering to the rocks, become other *Calli*, and thus supply the bundles of filaments which always occur in this species. Two or more subcartilaginous filaments, of the thickness of horse hair, generally rise from the same root; the stems are repeatedly dichotomous, with rather acute angles, which causes the bundled appearance of

the branches. The dissepiments are black; the joints short, and a black spot may frequently be observed in the middle, occasioned by a partial collapse of the juices. The capsules are disposed on the sides of the ultimate branches; before they burst they are ovate, but afterwards contract towards their apices. In their younger state, Ellis appears to have mistaken them for male flowers.

In drying it undergoes no change, and adheres but slightly to either glass or paper.

- A. *C. polymorpha*, growing on *F. nodosus*, natural size.
- B. Ditto, magnified 2.



A



B

Conferva lanuginosa

CONFERRA LANUGINOSA.

C. filamentis sub-simplicibus minutissimis, ferrugineis ; articulis longiusculis, medio-pellucidis ; capsulis sessilibus fecundis.

In the Sea, adhering to other *Confervæ*. At Swansea, common.

THE filaments of *C. rubra* and some other species of *Confervæ* often assume a ragged appearance as if in decay : and it was with equal pleasure and surprize that I found this appearance occasioned by the present elegant parasite which is so extremely minute that the highest power of the microscope is hardly sufficient to ascertain its structure. The filaments are sometimes simple and sometimes branched, but I have never been able to find more than two branches on the same filament : the capsules are round and sessile, and when two or more appear together, as is frequently the case, they are always disposed on the same side of the filament.

It differs from *C. cirrofa*, for which alone it might be mistaken, in its much smaller size, ferrugineous colour, and pellucid joints. In size it agrees with *C. nana*, but differs in almost every other respect : *lanuginosa* is moreover a marine, *nana* a fresh water species.

In drying it adheres to either glass or paper.

- A. *C. lanuginosa*, growing on *C. rubra*, natural size.
B. Ditto magnified 1.





CONFERTA TORTUOSA.

C. filamentis simplicibus rigidiusculis implicatis tenuibus; dissepimentis pellucidis; articulis cylindraceis longiusculis.

In Salt Pools by the River Yare near Yarmouth, and on Rocks in the Sea about Swansea.

THE present plant so nearly resembles *C. capillaris* in miniature, and so well agrees with the most striking characters of that species, that although it always appeared to me to be distinct, I hesitated on publishing it as such till this opinion was confirmed by that of my friend Mr. Turner, and by Dr. Roth, and Professor Mertens. I first found it in a Pool by the banks of the Yare, where *C. capillaris* also grew, and since on the rocks, and among the rejectamenta of the Sea at Swansea. The filaments are as fine as the hair of the human head: their growth is curled and entangled as in *C. capillaris*, but not brittle or so rigid as in that species: it differs also in the joints which are nearly twice as long; nor have I ever observed the swelling of the dissepiments already mentioned in the description of that plant.

When taken out of the water and exposed to air it becomes flaccid, and adheres but slightly to either glass or paper.

A. *C. tortuosa*, natural size.

B. Ditto magnified 1.



Handwritten text, possibly a signature or name.

CONFERRA LUCENS.

C. filamentis simplicibus tenuibus glaucis lubricis; articulis breviusculis; granulis in fasciis coacervatis.

On Rocks and Stones in clear rapid Rivulets. Frequent in Monmouthshire.

Jef. Woods, jun. Also in Glamorganshire.

THIS elegant species is found not unfrequently in the clear rapid rivulets of Glamorganshire, and most probably of other mountainous Counties; but does not often occur in a perfect state, the ends being extremely liable to be broken off, and the plant otherwise injured by the action of the current against the rocky and pebbly bottoms on which it grows, especially when the streams are swollen and flow with more than usual rapidity.

The filaments are simple and slender, and taper towards the ends, in length seldom exceeding three inches. The joints are short and almost pellucid near the dissepiments with a band-like aggregation of granules in the middle. When gathered and placed in stagnant water the filaments greatly resemble those of *C. spiralis*, but their different places and modes of growth will readily distinguish the two plants when growing. *C. rivularis* may at once be known from *C. lucens* by its darker colour, far greater length, and twisted growth.

In drying it adheres to either glass or paper.

A. *C. lucens*, natural size.

B. Ditto magnified 3.

C. Ditto Ditto 1.



CONFERVA LÆTE VIRENS.

*C. filamentis ramosissimis rigidiusculis arcuatis; ramulis alternatim
secundis; dissepimentis pellucidis; articulis longis.*

Rocks, Fuci, and Corallines in the Sea. About Swansea, frequent.

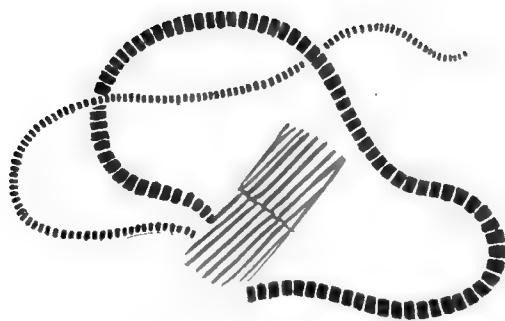
THIS species is extremely common on the shores of many parts of South Wales, but has not to my knowledge been observed elsewhere. It grows indifferently on stones, fuci, and corallines, and often nearly fills the basins among the rocks, where it may at once be distinguished from its congeners by its light green color and bushy mode of growth. Its root, a small callus, gives rise to one, two, or more filaments which are from three to six inches in length and irregularly branched; the branches are disposed without much apparent order, sometimes dichotomous, or alternate, though not unfrequently three or four issue successively from the same side, they are much curved, and therein this species differs strikingly from *C. rupestris*, the branches of which are remarkable for their straightness: many together of the ultimate branches are arranged alternately on each side of the shoot, and these are again beset with ramuli disposed in the same order, of which one issues from the end of nearly every joint. The dissepiments are pellucid and divide the filaments into joints whose length varies very much in the same specimen, but is always greatest in the principal filament and least in the ramuli. No fructification has been yet observed.

In drying, it preserves its colour, and adheres slightly to paper, but not to glass.

A. *C. lætè virens*, natural size.

B. Ditto magnified 2.





18

... ..

CONFERRA FLACCA.

C. filamentis simplicibus tenuissimis minutis flaccidis; dissepimentis pellucidis; articulis brevissimis.

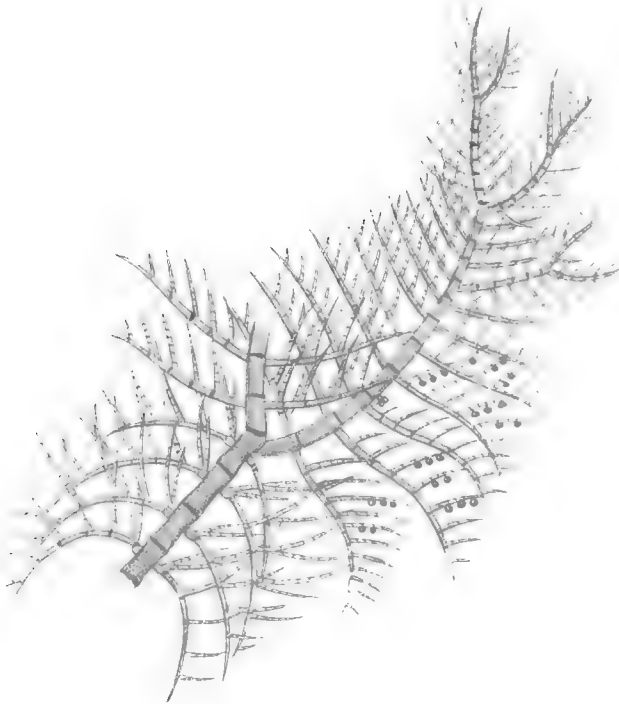
In the Sea, adhering to Fuci and Confervæ.

THIS delicate parasite has at present been only observed in the neighbourhood of Swansea, but is most probably not uncommon elsewhere: it is found on Confervæ, on the smaller Fuci, and also sometimes on the sides of boats or other wood exposed to the sea water. It grows in loose patches of a green colour, generally about half or three fourths of an inch in length. The filaments are almost universally, if not always, simple: among a great number which I have examined only one could be found with any appearance of ramification, and in this it is very possible I may have been deceived, as I could never find another. The dissepiments are pellucid: the joints in length but little more than half their thickness. No fructification has been discovered. There is no chance of its being confounded with any other species with which I am acquainted: the much greater length of its filaments, and different mode of growth, will, at once, distinguish it from *C. confervicola*.

In drying it adheres firmly to glass and paper.

A. *C. flacca*, natural size.

B. Ditto magnified 1.



[5]



... ..

CONFERVA PLUMULA.

C. filamentis ramosissimis ; ramis alternis pinnatis ; pinnis oppositis ; ramulis ultimis secundis ; articulis longiusculis ; capsulis brevius pedicellatis.

C. plumula. Ellis in Phil. Trans. LVII. p. 426.

In the sea, adhering to *Confervæ*. At Brighton, *Ellis*. In Catwell Bay near Swansea, during the summer months.

ELLIS gave an excellent drawing of this beautiful species to the Royal Society, in the year 1768, which was published by them in the 57th Volume of their Transactions ; but since that time no Botanist appears to have noticed it, and it remained a desideratum till I met with it on the beach at Swansea, in August, 1802.

The plant is of a light red colour, and from the fineness of its filaments, has, when lying on the shore, the appearance of an *Ulva* in decay. The root I have not been able to observe, but we may fairly conclude, from analogy, that it is a minute callus. The whole frond is pellucid, with dark dissepiments: the branches are pinnate, with opposite pinnæ bearing smaller branches, arranged on one side only: the length of the joints varies very considerably, and is not unfrequently twice as great as in the annexed drawing. The capsules are very numerous, placed on short fruit stalks, arranged like the ultimate branches on which they grow ; and, as in all other species allied to this, discharging their seeds by an orifice at the top. At C, I have given a sketch of four clustered together, which may occasionally be seen, but appears to be a *lusus naturæ*.

- A. C. plumula, natural size.
- B. Ditto magnified 3.
- C. Ditto Ditto 1.

2



R

*g. m. m. m.*

CONFERVA PUNCTALIS.

C. filamentis simplicibus lubricis tenuissimis; dissipationis obscuris, articulis breviusculis cylindricis, succus in globulos solitarios demum congestus.

C. punctalis, Muller in Nova Acta, Pet. III.

In Ditches and Pools not unfrequent.

PERHAPS no Botanist examining this species in its younger state only would allow it to be the *C. punctalis* of Muller, nor till it has arrived at its maturity, when the green matter of the joints collapses into a series of globules; then, under any other than the highest powers of the microscope, the dissipation by their extreme thinness entirely elude the closest observation, and the plant accords well with Muller's description, "*filamentis inarticulatis, simplicibus, serie punctosum longitudinali.*"

C. punctalis is frequently met with in Pools and Ditches, as well on Heaths as in Marshes. The colour of its filaments varies from a pale bright green to a yellowish green; their length is from one to two inches; but what will at once distinguish this plant from all its congeners is their extreme tenuity, which is such that when single they can hardly be distinguished by the naked eye: in this respect *C. punctalis* resembles *C. muralis*, but the different color, place and mode of growth, and far different structure when examined with a glass, preclude the possibility of its being confounded with that species. The dissipation from their tenuity are observable only when a strong magnifying power is applied; they divide the filaments into joints, whose length is about equal to their thickness. Whilst the plant is young, these joints are nearly of a uniform greenish color, but with age the green matter of each joint collapses into a globule, and

occasions the aforementioned bead-like appearance; whether this is the fructification future observation must determine; no other has been discovered.

When dried it shines like *C. pectinalis*, and adheres firmly to both glass and paper.

A. *C. punctalis*, natural size.

B. Ditto, magnified 1.



A



B

Conifera sequaria.

CONFERRA SCOPARIA.

C. filamentis ramossissimis rigidis, ramis fasciculatis, ramulis alternis acuminatis, dissèpimentis obscuris, articulis brevibus.

C. scoparia. Sp. Plant. p. 1635. Fl. Ang. p. 595. Fl. Scot. p. 981. With.
IV. p. 131.

C. marina pennata. Dill. Musc. p. 24. t. 4. f. 23.

Fucus scoparia s. Pennachio marino. Bauhin pin. p. 366. Hist. III. 800.

On Rocks and Corallines in the Sea, not uncommon.

THE above references sufficiently prove that *C. scoparia* is one of the few *Confervæ* which have been long known and well ascertained by Botanists; indeed it is so far from uncommon, is so obviously different from every other species, and with its clustered branches often bears so striking a resemblance to a painter's brush or pencil, that it is almost impossible it should have been otherwise.

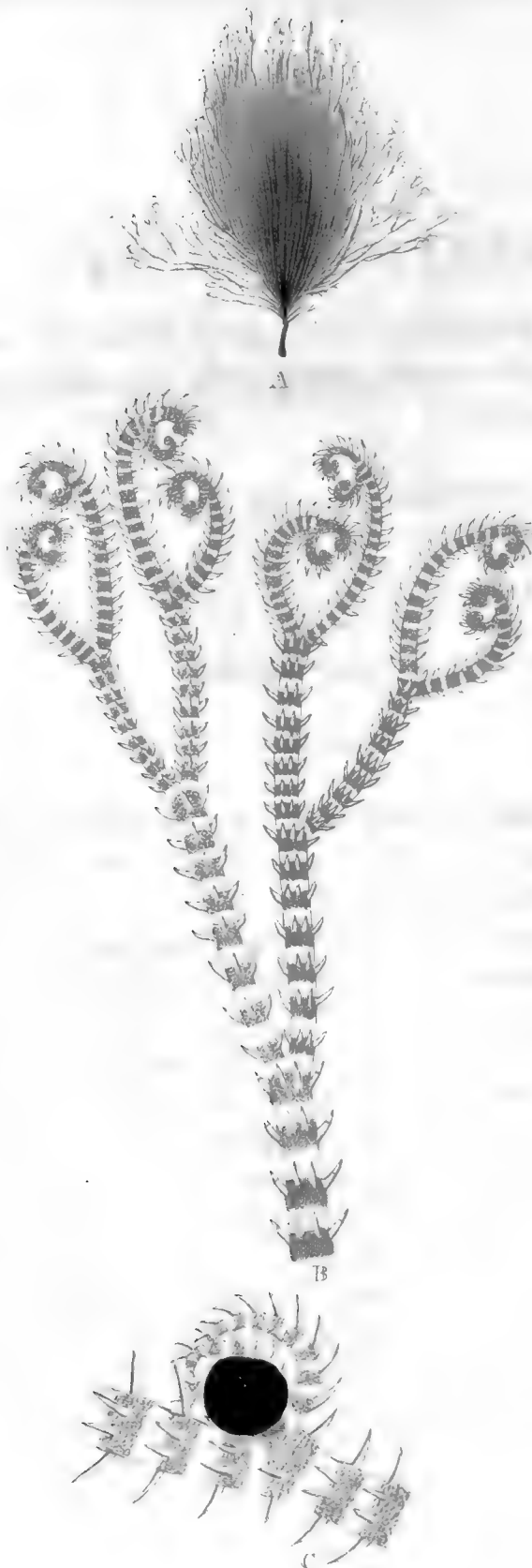
This species when young is of a brownish olive, changing with age to a russet brown. From a small callus one or more stems arise, varying in length from two to six, and Mr. Lightfoot says to nine inches. The branches are numerous, alternate; the upper ones often so much longer and more clustered than the lower, as to give them a brush-like appearance; they are every where beset with alternate spine-like ramuli, which are highly characteristic of the species. The dissèpiments are of a darker colour than the rest of the filament, and divide it into joints, whose length about equals their thickness. No fructification has been discovered. Its texture is remarkably like that of many Corallines, so that doubts have arisen in the minds of several Botanists how far it really belongs to the vegetable kingdom. Naked specimens of this plant are not unfrequently mistaken

for *Conferva pennata*, which however is a very different species, seldom exceeding two inches, and formed of extremely thin, mostly undivided filaments.

C. scoparia in drying will not adhere, or but very slightly, to either glass or paper.

A. *C. scoparia*, natural size.

B. Ditto magnified 3.



Conferva ciliata.

CONFERVA CILIATA.

C. filamentis dichotomis apice forcipatis; dissepimentis verticillatim ciliatis articulis utrinque obscuris medio pellucidis, capsulis subglobosis lateralibus.

C. ciliata. Ellis in Phil. Transf. LVII. p. 425. t. 18. f. h. H. H. Ang. p. 599. Fl. Scot. p. 998. With. IV. p. 137.

C. pilosa. Roth. Cat. Bot. II. p. 225. t. 5. f. 2.

Rocks, Stones, and Fuci in the Sea, not unfrequent.

THIS highly elegant Conferva, though sufficiently common on most of our shores does not appear to have been noticed by Linnæus, Ray, or by any author till Ellis published an excellent figure of it in the 57th vol. of the Philosophical Transactions. It grows in bushy masses, seldom exceeding two inches in length, and varying in color from a bright to a purplish red. The root appears to be a small Callus, from which seldom more than one stem arises, but I have sometimes observed a connecting filament between these Calli, which whether it should be considered as a creeping stem or root I am at a loss to decide, not having been able to separate it from the substance on which it grows. The filaments are branched; the branches repeatedly dichotomous, remarkably incurved at their extremities in a forceps-like manner. The dissepiments are obsolete, but the joints at each end are generally more or less swollen, and of a reddish color, occasioned by reticulated veins, which as in *C. diaphana* leave the middle of the joint perfectly colourless and transparent; what however strikingly distinguish this from that species are whirls of pellucid spines which encircle each dissepiment, and give this plant a beautiful appearance under the microscope. The capsules

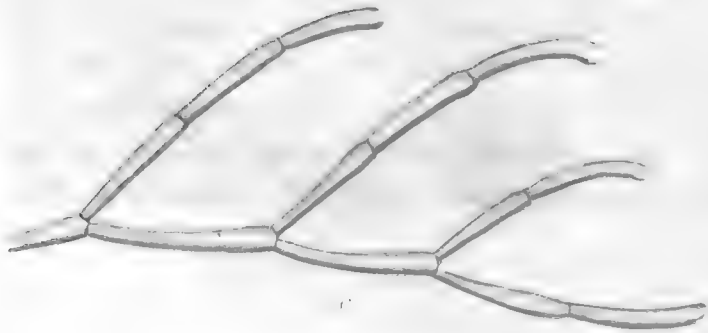
are roundish, lateral, nearly sessile, and mostly accompanied by three or four short incurved ramuli.

It adheres slightly to paper, but scarcely at all to glass.

A. *C. ciliata*, natural size.

B. Ditto, magnified 3.

C. Ditto, ditto 1.



Conferva aquisetifolia.

CONFERRA EQUISETIFOLIA.

C. filamentis ramossissimis; ramis acuminatis elongatis subsimplicibus;
ramulis verticillatis brevibus dichotomis articulis ramulorum longis.

C. equisetifolia. Fl. Scot. p. 984. With. IV. p. 133.

C. multifida. Fl. Ang. p. 596. With. IV. p. 132.

C. imbricata. Fl. Ang. p. 603. Roth, Cat. Bot. I. p. 189?

C. verticillata. Roth in Schrader's Journal, III. p. 332? Schmidel Iter. t. 2.

Muscus marinus hirsutus, flagellis longuribus rarius divifus ruber. Hist. Ox. III.
p. 650. f. 15. t. 9. f. 7.

On Rocks and Stones in the Sea, not unfrequent.

C. Verticillata and *C. Spongiofa*, already figured in this work, are very nearly allied to the present species; its red clay color and acuminate branches, with the constantly dichotomous ramuli, and their long joints, will however readily distinguish it.

It is occasionally found on most of the British Coasts, generally more or less covered with other *Confervæ* growing parasitically on it. The length is from five to eight inches, the thickness nearly that of a crow's quill, and the color a dull red; the stem solitary and repeatedly branched; the branches are subulate and vary much in their disposition; in some specimens they are numerous, short, and branched, in others long and nearly simple: in the same plant they vary also, as, though their disposition is mostly alternate; several together not unfrequently issue from the same side of the stem. The stem and branches are every where clothed with a profusion of ramuli issuing in whirls from the end of each joint, which being longer than the joints are tiled on each other and give the plant a very rough and spongy appearance. In the stem and branches the joints

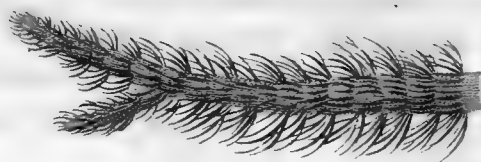
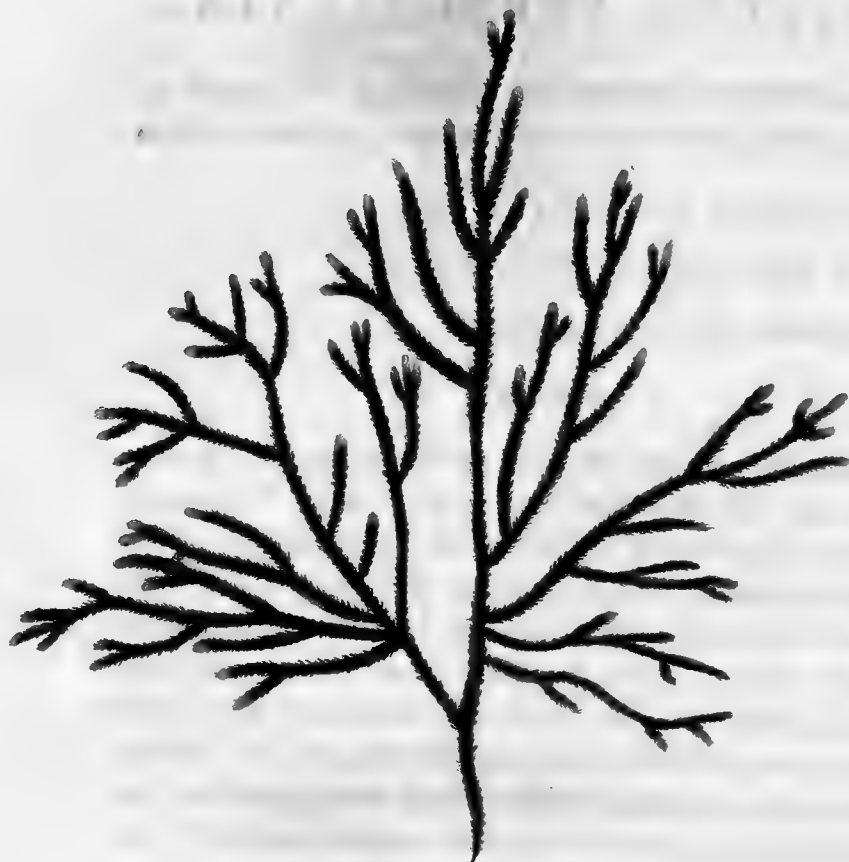
are cylindrical and short, but in the whirled ramuli the length is generally four or five times greater than the thickness, and they are slightly contracted at the lower and thickened at the upper end. On the older branches, particularly about the root, they are frequently swollen, and assume more or less of a globular appearance, in the same manner but more strikingly so than in *C. littoralis*. The fructification has not yet been discovered.

The figure given by Schmidel of this plant in his journey, above quoted, is so excellent, that it is hardly possible it should be mistaken; but though Dr. Roth refers to this figure, and even says that his specimen comes from Schmidel's herbarium, yet as he describes the whirled branches as constantly simple, I have thought it right to quote him with a mark of doubt. I have referred *C. multifida* of Hudson, as well as his *C. imbricata*, to this species, on the authority of an authentic specimen communicated by the Rev. Dr. Goodenough to D. Turner.

In drying the juices collapse into a red parenchymous line, and it adheres to neither glass nor paper.

- A. *C. equisetifoli*, natural size.
- B. Ditto magnified 6.
- C. One of the whirled ramuli, ditto 2.





CONFERVA VERTICILLATA.

C. filamentis cartilagine subdichotomis; ramulis ad diffepimenta verticillatis brevissimis incurvatis plerumq. bifurcis; articulis brevibus.

C. verticillata. Fl. Scot, p. 984. With. IV. p. 133.

C. myriophyllum. Roth in Schrader's Journal, III. p. 335.

On Rocks and Stones the Sea, not unfrequent.

C. Verticillata is extremely plentiful in the pools left by the tide about Dover, and is more or less frequently met with on most of our coasts. It is generally from four to five inches in length, and of a dull olive color: the root is a callus from which several irregularly branched filaments arise: the stem and branches are of a horny nature, and every where beset with close whirls of rigid incurved, hair-like ramuli, which are mostly forked but sometimes simple, and though short yet twice as long as the joints of the stem. In these ramuli short joints are faintly observable with a microscope, very nearly resembling those of *C. spongiosa*, to which this plant is closely allied, but from which it may in general be at once distinguished by its forked, incurved and regularly verticillate ramuli; but specimens sometimes occur so intermediate that it is not easy to determine to which they belong. The fructification has not been discovered, but is most probably similar to that of *C. spongiosa*.

It has already been remarked in the description of *C. spongiosa*, that the present plant was confounded by Hudson with that species, and we are indebted to Lightfoot for having first separated them. Roth, in the first volume of his *Catalacta Botanica*, and in Schrader's Journal, has followed Schmidel, and described *C. equisetifolia* under the name of *C. verticillata*, though he has erred in ascribing to it simple ramuli.

In dying it will not adhere to glass or paper.

A. C. verticillata, natural size.

B. Ditto magnified 3.

C. Ditto ditto 1.



CONFERVA TOMENTOSA.

C. filamentis ramosissimis tenuissimis densissimè implexis ramis divaricatis ultimis simplicibus articulis longis.

C. tomentosa. Fl. Ang. p. 594. Fl. Scot. p. 982. With. IV. p. 130.

C. ceramium tomentosum β . Roth. Cat. Bot. II. p. 181. Fl. Germ. III. pars. 1. p. 470.

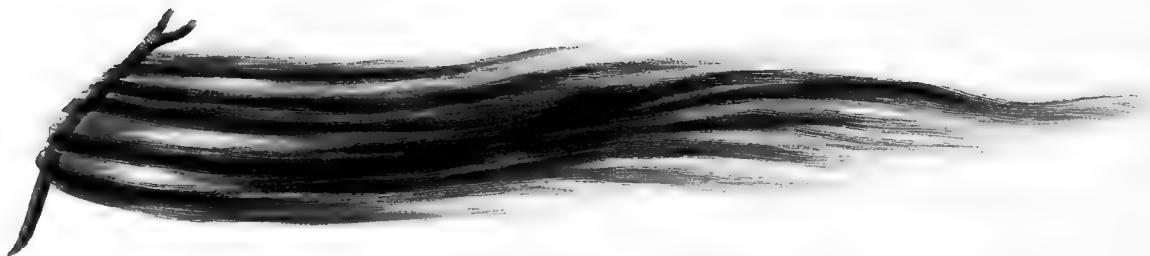
Conferva marina tomentosa, minus tenera et ferruginea. Ray, Syn. p. 59. Dill. Musc. p. 19. t. 3. f. 13.

In the Sea frequent, generally growing on *Fucus vesiculosus*.

ALTHOUGH, according to the remarks of my friend Dawson Turner in the seventh volume of the Linnean Transactions, the specimen preserved in the Dillenian Herbarium as *Conferva marina, tomentosa*, &c. is only a bad specimen of *C. littoralis*, yet the description in the Historia Muscorum, and also the original drawing in Sir Joseph Banks's Library, seem to prove that Hudson was correct in referring that synonyma to the present species.

The color of *C. tomentosa* is a pale greenish or rufet brown, remarkably destitute of gloss, especially when dried: the length generally from three to five inches. Its filaments are repeatedly branched, so extremely slender as to hardly be discernible without a microscope, and so entangled and twisted together in rope-like coils as to make it absolutely impossible to separate without breaking them. The branches issue nearly at right angles; about the root they are rather numerous, but less so towards the end, and the terminal ones are long and simple; the length of the joints is at least three times as great as their thickness; they are perfectly cylindrical, and when examined under a glass generally appear quite colourless,





Coniferus lubricus.

CONFERVA LUBRICA.

C. filamentis ramofissimis tenuibus longissimis splendoribus lubricis ramis aculeiformibus articulis breviusculis.

In clear Rivulets on Stones and Wood. At Lounde, near Yarmouth; and on Sketty Burrows, near Swansea.

THIS elegant Conferva, which I first found sparingly in a rivulet at Lound, near Yarmouth, where my friend D. Turner and myself have since repeatedly looked for it in vain, abounds in a clear stream on Sketty Burrows, near Swansea. I cannot find that it has been heretofore described, and there is no other species to which it can be referred, or with which it can possibly be confounded.

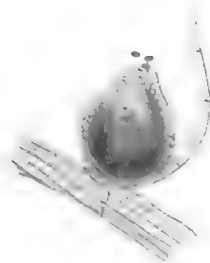
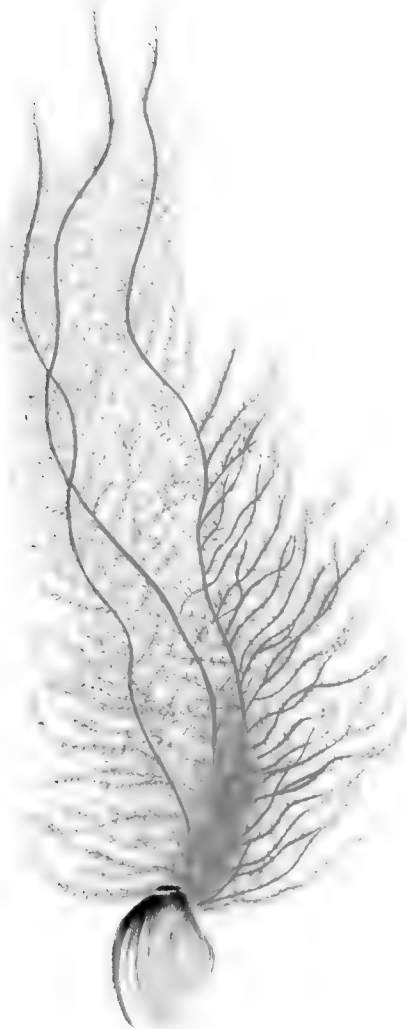
It grows on wood or stones in large gelatinous masses, frequently from six inches to near a foot in length. The color is green with a slight tinge of blue; the filaments are very much branched; the branches disposed without any apparent order, but uniformly issuing at an acute angle with the stem. The ultimate ramuli are numerous, mostly short, thornlike, and disposed also without order, being sometimes alternate and three or more not unfrequently issue together from the same joint. The joints are short, and when the juices have collapsed, as is generally more or less the case, they give the plant a very beautiful appearance under the microscope. The fructification has not been discovered.

In drying it adheres to both Glass and Paper.

A. *C. lubrica*, natural size.

B. Ditto, magnified 3.

C. Ditto, ditto 1.



Asplenium cuneifolium

CONFERVA BYSSOIDES.

C. filamentis decomposito-pinnatis; ramis ramulifq; alternis, extremis perbrevibus, subfasciculatis; dissepimentis ex venarum anastomosis; articulis longiusculis, capsulis ovatis sessilibus.

C. byssoides. Eng. Bot. p. 547.

Fucus byssoides. Goodenough and Woodward, in Linn. Trans. III. p. 229.

On Rocks, Stones, and Fuci in the Sea, common.

THE present species was first described by Dr. Goodenough and Mr. Woodward, under the name of *Fucus byssoides*, in the Transactions of the Linnean Society. It was not however without considerable hesitation that they thus arranged it with the Fuci; and Dr. Smith soon after in English Botany, removed it to the *Confervæ*, to which it properly belongs, as its congeners are at present all placed in this genus, and among them are several whose dissepiments have an equally small appearance of being formed by 'annular strictures.'

C. byssoides is extremely common on most of our shores; it grows in large masses, varying in length from three to ten inches, and in color from a reddish-brown to a light or purplish red. The root is a minute callus. The filaments are triply or quadruply pinnated, extremely flaccid, flexuose, pellucid and beautifully striated by longitudinal veins, each of which arching over at or near the same place appears to form the dissepiment. The branches and ramuli are all alternate; the primary branches long, the extreme ones very short, and subfasciculate; giving the plant throughout a singularly tufted appearance. The joints are rather long; capsules ovate, sessile, mostly axillary, reticulate, and precisely of the same nature as those of *C. coccinea*.

In drying the color becomes a dark dull brown, soon changing almost to black, and it adheres, though but slightly, to either Glass or Paper.

- A. C. byssoides, natural size.
- B. ditto, magnified 2.
- C. Capful of ditto ditto 1.



Conserva varipara.

CONFERVA VIVIPARA.

C. filamentis dichotomo-ramosis, ramis flexuosis ad dissepimenta bulbiferis, bulbis piliferis, articulis longis, capsulis lateralibus sessilibus.

In boggy rivulets, growing on stones and moss, &c. near Yarmouth. *Dawson Turner, Esq.* Near Cadoxton juxta Neath, Glamorganshire. *W. W. Young.* On a heath about a mile west of Five Lanes, between Launceston and Bodmin, Cornwall.

THIS most interesting species I received at the latter end of May, 1802, from my friend Dawson Turner, who first discovered it in the neighbourhood of Yarmouth, since which it has been once found, though in small quantities, near Neath; and in September last I was so fortunate as to meet with it on a boggy heath in Cornwall, where in several rivulets it almost clothed large masses of *Sphagnum latifolium*. Mr. Turner has also received it under the name of *C. pumilio*, from Professor Mertens, who gathered it near Bremen.

It grows on various substances, in small, delicate, bushy tufts, never I believe exceeding half-an-inch, while its usual length is not more than two lines. The color is a yellowish green, assuming a browner tinge with age. The stem is irregularly dichotomous, and flexuous, as also are the branches, and under the microscope they have rather a woody appearance. The length of the joints is about five times greater than their thickness. The fructification is in sessile capsules, at the end of the joints. At most of the dissepiments where there are no capsules, a small bulb or bud is observable, from which proceeds a very long, unbranched, extremely slender, colorless filament, similar to the hairs of the *Rivulariæ*, and jointed, but with joints far longer than those of any other part of the plant. These small bulbs issue only from the ends of such joints as produce no capsules, and they appear to me precisely to correspond in nature with the viviparous bulbs in several phænogamous plants, and their long filaments have

greatly the appearance of being occasioned by the premature vegetation of their germs.

For the magnified drawing I am indebted to my friend Joseph Woods, jun. Esq.

In drying it changes to more of a dull ash-color, and adheres to both glass and paper.

A. *C. vivipara*, growing on *Sphagnum latifolium*, natural size.

B. ditto, magnified 2.

C. ditto, ditto 1.



Cyperus aridus

CONFERVA SORDIDA.

C. filamentis simplicibus tenuibus, dissepimentis annularibus, articulis longiusculis pellucidis.

C. fordida. Roth, Cat. Bot. I. p. 177. t. 2. f. 4. Fl. Germ. III. part. 1. p. 504.

In Ponds, Pools, and Ditches frequent.

SOME time since I sent specimens of this plant marked *C. fordida*, together with the magnified drawing represented at B to Dr. Roth, requesting his opinion, and he favored me with the following remark: "Omni modo convenit cum mea *Conferva fordida*; at genicula parum contracta in meis specimenibus, quod forsan ab ætatis diversitate dependet."

C. fordida in pools where the water has long remained without much motion, forms round the grafs or reed on which it grows a semi-transparent cloud-like mass, of a yellowish green color, but this readily yields to a small current, and the plant then floats in denser masses on the surface. When the water has been turbid, these masses become mottled by the finer parts of the decayed vegetable matter and mud which lodges on them, and they then assume a dirty appearance. The filaments are very long, but it is difficult to ascertain the precise length from their entangled mode of growth; they are simple and extremely slender; the dissepiments from the cylindricity and transparency of the filament appear like rings, and in fact these rings only are apparent, and it is only from analogy that I have supposed a dissepiment to exist, and from the probability that it may be transparent in common with the other parts of the filament. The length of the joints is mostly about equal to four times their diameter; they are frequently perfectly colorless under the higher powers of the microscope, but a slight tinge of green is then observable in young and perfect specimens. No fructification has been discovered.

From *C. rivularis* and *C. genuflexa* in a young state with which alone of the species heretofore described there is any danger of confounding it, it may be distinguished by its lighter color and pellucid joints. From the former it also differs in its mode and place of growth, its longer joints, and in the greater tenuity of its filaments, and from the latter in its much greater length.

In drying *C. fordida* adheres to both Glafs and Paper.

A. *C. fordida*, natural size.

B. Ditto, magnified 1.



CONFERVA UMBROSA.

C. filamentis ramosis repentibus fragilibus brevibus-obtusis, ramis curvatis simplicibus subsecundis articulis longis cylindraceis inflatisque.

C. umbrosa, Roth. Cat. Bot. I. p. 191. t. 4. f. 3. Fl. Germ. III. part. 1. p. 521.

C. Arenaria. Roth. Cat. Bot. II. p. 217.?

On Boggy Ground near Swansea.

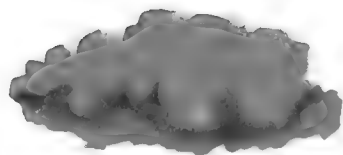
THERE is every reason to believe that the present species is sufficiently common in certain situations, though I am not aware of its having been noticed in Britain, till I lately detected it on part of a bog, the surface of which had been recently burnt, adjoining Singleton Wood, near Swansea: probably however it has been often passed by as a variety of *C. frigida*, to which, till placed under a microscope, it bears a great resemblance, but may be distinguished by its growing in smaller patches, and by its darker color. It was first discovered by Dr. Roth, who figured and described it in the first Fasciculus of his *Catalecta Botanica*, under the name of *C. umbrosa*, and who, in the second Fasciculus, has given another species, under the name of *C. arenaria*, which I apprehend is only a variety of the same, as I have seen the joints short and inflated in one branch, whilst in another on the same plant they were cylindrical, and in length fully equal to six times their diameter.

The filaments are creeping, and so remarkably fragile, that it is difficult to ascertain their length, which I believe never exceeds and seldom attains to half an inch. There are generally four or five branches which are simple, and most frequently disposed on the same side of the stem, but sometimes alternately; the apices are every where blunt: the dissepiments are more or less contracted and divide the filaments into joints, which vary greatly in shape and length,

as before observed ; and that which forms the apex of the branch is often of a darker color than the others. The fructification has not been discovered.

In drying it adheres to glafs, and assumes though in a much less degree, somewhat of that shining appearance which is so striking in *C. pectinalis*.

- A. *C. umbrosa*, natural size.
- B. ditto, magnified 3.
- C. ditto, ditto 1.



Conjuncta ciliata.

CONFERTA OCHRACEA.

C. filamentis ramosissimis tenuissimis, perfragilibus densissimè compactis, gelatinam ochraceam tamen in floccos secedentem constituentibus.

C. ochracea. Roth, Cat. Bot. I. p. 165. t. 5. f. 2. Fl. Germ. p. 494.

In Pools and Ditches, common.

THIS singular species is far from uncommon in Pools and Ditches, more especially in boggy situations, and often nearly fills them with large gelatinous and variously undulated masses, differing in shape according to the rapidity or slowness of the current. The color often varies in the same mass through every possible shade of a dull yellow, and Dr. Roth observes that it frequently tinges stagnant waters as if they were mixed with milk, and attributes this appearance to the transparency of the filaments, but as it is only observable on the surface of the masses and where the filaments are much exposed to the sun, I should rather conceive it to arise from their having been bleached by its action.

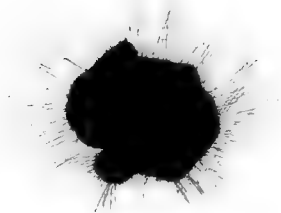
C. ochracea is so extremely fragile that the slightest touch or even any considerable agitation of the water breaks the filaments into a thousand pieces, which are so light as to remain suspended in the water whilst the least agitation continues, and then subside to the bottom in the form of an ochraceous powder. In this state only the plant can be examined, and presents under the microscope a multitude of fragments so small that it is impossible to ascertain the original length of the filaments, and so extremely slender that under the highest microscopic power their thickness hardly appears equal to that of human hair of its natural size. Two or more branches are frequently observable on the same fragment. They are diffuse, mostly inflected, and disposed without any apparent order. Dissepiments may occasionally be faintly distinguished, but from the extreme tenuity of the filaments, not so as to ascertain the length or nature of the joints.

further than that they are perfectly cylindrical. No fructification has been discovered.

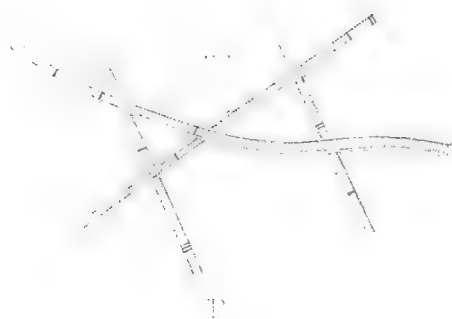
In drying it adheres to both Glafs and Paper.

A. *C. ochracea*, natural fize.

B. Ditto, magnified 1.



A



Conjura fentinalis.

CONFERVA FONTINALIS.

C. filamentis simplicibus cylindricis, truncatis, atro-virentibus, fasciatis; dissepimentis obscuris, articulis brevissimis.

C. fontinalis. Sp. Plant. p. 1633. Fl. Ang. p. 592. Fl. Scot. p. 976. With.
IV. p. 128. Fl. Dan. t. 651. f. 3. Roth, Fl. Germ. III. pars. 1. p. 593.
Cat. Bot. II. p. 191.

Conferva minima bifsi facie. Dill. Musc. p. 14. t. 12. f. 3.

Conferva fontalis fusca omnium minima mollis. Ray Syn. p. 58.

In Rivers, Pools, Ditches, &c. common.

IN Dillenius's Herbarium the specimen corresponding with t. 2. f. 3. is entirely destroyed by age, which perhaps renders it impossible positively to ascertain the plant he intended, but his description in the *Historia Muscorum* so strikingly corresponds with every appearance of the present plant, that I feel no hesitation in publishing it as that species. From spring to autumn it abounds in cisterns, ditches, pools, rivers, and in short in waters of almost every description, generally floating in irregular masses on their surface. I gathered it lately in the King's Bath at Bath, where the temperature is 112 degrees, and it seemed not at all affected by the heat. In aerated waters, as Dillenius remarks, the surface of the mass assumes an ochery color; in ditches and stagnant water it is frequently covered with decayed vegetable matter, in which it appears to delight, and I have found it in a rapid part of the River Lea, where its color was of a very dark and bluish green, and as it floated on the surface I at first mistook it for *C. distorta*, for which, as Dr. Roth observes, it is very liable in this state to be mis-

taken, especially by those who have only seen the figure of that plant in the *Flora Danica*. It often may be found on pieces of decaying wood, &c. but I much doubt its at all adhering to them, as it does not appear to possess any root; it consists merely of a filament equally obtuse at both ends, and divided regularly by disseminations at very short distances from each other.

Dillenius's *C. gelatinosa*, *omnium tenerrima*, &c. * published in the second Fasciculus of this work under the name of *C. limosa*, I am inclined to suspect is only the present species in a younger state, and that when covered with water that plant in time rises to the surface and assumes the appearances here described, the principal difference is in the size and color; in *C. fontinalis* the filaments are much larger, the color browner and not glossy as in *C. limosa*; the joints also are far more distinct and more regularly disposed. It is nearly allied to *C. decorticans*, but differs materially in size, in color, and in its much shorter joints, nor does it ever form the densely matted patches, which give a striking character to that species.

The growth of *C. fontinalis* is astonishingly rapid, and M. Adanson's observations, from which I have given an extract in the description of *C. limosa*, apply equally to this and that plant.

When dried it alters its appearance but little, and adheres firmly to either Glass or Paper.

A. *C. fontinalis*, natural size.

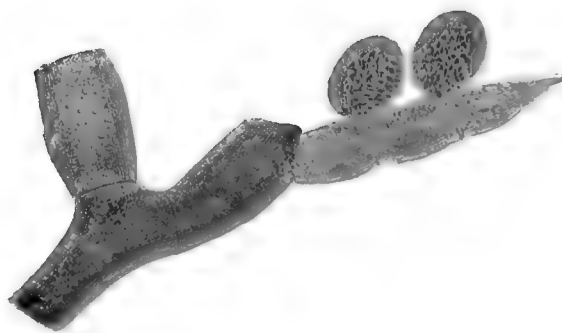
B. Ditto, magnified 1.

* Hist. Musc. p. 15. t. 2. f. 5





B



C

Conferia tetragyna

CONFERRA TETRAGONA.

C. filamentis ramosissimis ramulis fasciculatis brevibus simpliciusculis ; articulis ovato-cylindraceis, capsulis sessilibus sub globosis.

C. tetragona. With. V. p. 405.

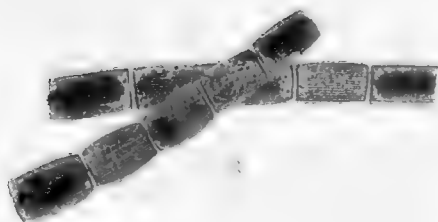
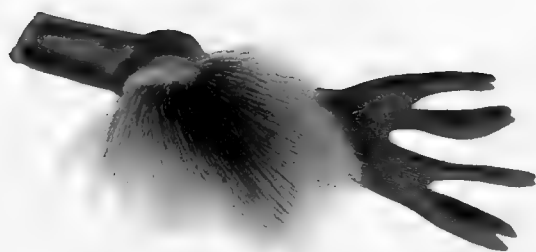
In the Sea, parasitical on the Fuci. At the Bill of Portland, *Col. Velley.* In Caswell and Llanglan Bays, near Swansea. Shore at Weymouth, *D. Turner.*

THIS elegant Conferva was discovered by Col. Velley and Mr. Stackhouse at the Bill of Portland, and by them communicated to Dr. Withering, who first published a description of it in an Appendix to the third edition of his arrangement of British plants.

C. tetragona is a species by no means found either generally or in abundance ; it grows parasitically on the larger Fuci in shrubby tufts, of a light purplish red color, seldom exceeding two inches in length. The root is a callus, common to many straight and undivided stems, beset with branches, not disposed as in *C. plumula* on two opposite sides only, but proceeding indiscriminately from every part of it ; nearest the root short, thence gradually increasing in length to the center, and again decreasing towards the summit, so that the general outline is irregularly ovate ; they are again divided nearly in a similar manner and are beset with numerous clustered spine-like ramuli, extremely short and for the most part simple, composed of joints somewhat resembling those of *Fucus articulatus*, the ultimate one terminated by an acute point. The fructification consists of small globular sessile capsules arranged on the upper side of the armuli.

In drying it becomes darker, and adheres both to Glass and Paper.

- A. C. tetragona, natural size.
- B. Ditto, magnified 3.
- C. Ditto, ditto 1.



Cynura fucicola

CONFERVA FUCICOLA.

C. filamentis coespitosis simplicibus, obtusis; dissepimentis pellucidis parum contractis; articulis longiusculis.

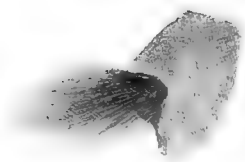
C. fucicola. Velley's Marine Plants. pl. 4. With. IV. p. 136.

In the Sea; parasitical on *Fucus nodosus* & *vesiculofus*, not uncommon.

MY friend Col. Velley first discovered the present species, and gave a correct representation and description of it among the colored figures of Marine plants with which he has favored the public. It is I believe far from uncommon on any of our shores, generally growing on thick tufts on *Fucus vesiculofus*, and sometimes, but much less frequently, on *F. nodosus*. Col. Velley justly remarks that it does not seem to possess that indifference with respect to places of growth which is usual in Marine plants, as it has never been detected on rocks, shells, or other extraneous bodies either by him or myself. An immense number of filaments generally grow together, thickly clustered at the root, but while in the water diverging in a circular direction, and varying from four or six lines to an inch in length: they are always unbranched and obtuse at the apices. The color is of a dirty yellow or brown, somewhat glossy when dried, and when viewed with a microscope the whole filament exhibits a considerable degree of transparency. The dissepiments are nearly colorless and slightly contracted; the joints are in length about equal to twice their thickness and are filled with minute granules, which may probably prove to be the fructification as no other has been discovered.

In drying this plant adheres, though not very firmly, to either Glass or Paper, its substance inclines to gelatinous.

- A. *C. fucicola*, natural size, growing on a piece of *Fucus vesiculosus*.
- B. Ditto, magnified 1.



COFERVA PROTENSA.

C. filamentis ramosissimis, ramis diffusis, maximè elongatis, apicibus pellucidis articulis longiusculis.

In Rivulets and Springs growing on Stones, Wood, Reeds, and other aquatic vegetables; frequent about Swansea.

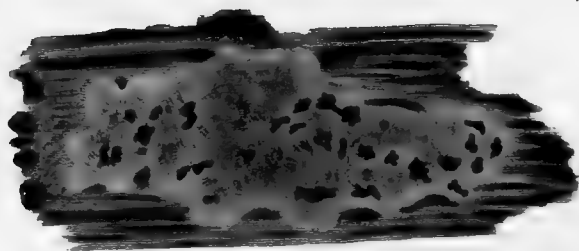
THE present species, though hitherto it has remained unnoticed, occurs in nearly every brook and rivulet about Swansea, growing on stones, sticks, grasses, reeds, and other aquatic plants: I have also met with it about Dover, and have no doubt it is by no means unfrequent in such situations. The color is a light green; the filaments vary from two lines to half, and sometimes to three fourths of an inch in length, and are much branched. The branches are numerous, diffuse, and towards the apices so lengthened out and pellucid that the termination of them is not easily discovered. The joints are of uncertain length, and are shortest in the stem and longest in the pellucid ends of the branches; with age they not unfrequently become inflated, and the juices in drying often collapse so as to form two opaque longitudinal lines parallel to each other, and leaving the remainder of the joints pellucid. The fructification has not been discovered.

The Plant in drying adheres to either glass or paper.

A. *C. protensa*, natural size.

B. Ditto, magnified 3.

C. Ditto, ditto 1.



13



100 100 100 100 100 100 100 100 100 100

CONFERRA RUBIGINOSA.

C. filamentis ramosissimis rigidis erectiusculis, ramis floruoſis patentibus in maſſam ſub-ſolidam rubiginofam implexis-articulis longis.

On Rotten Wood.

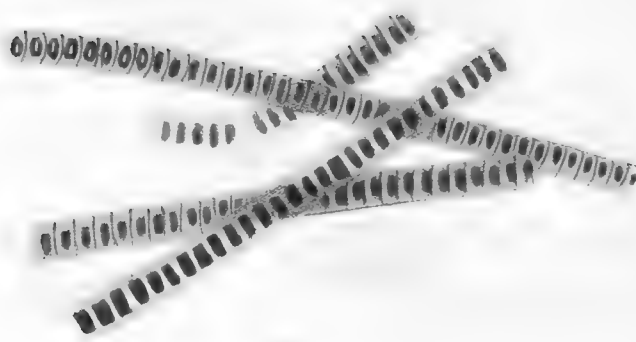
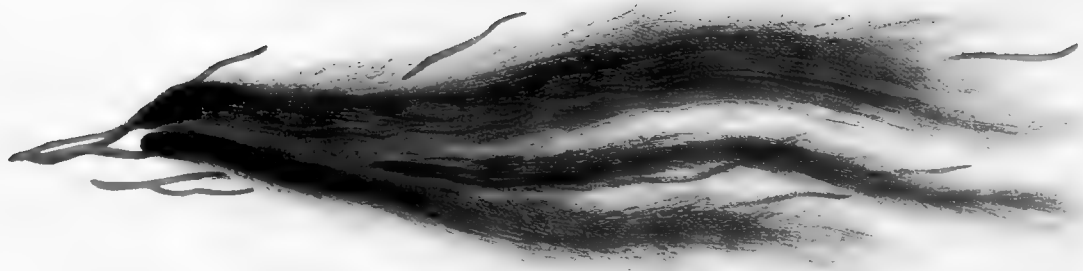
FOR the preſent ſpecies I have in vain ſought through the Genus *Byſſus* in moſt of thoſe authors who have deſcribed that branch of *Cryptogamia* in which I conceive it moſt probable that it would from its nature have been arranged. I therefore conclude that it has hitherto eſcaped notice, and I have decided on giving it a place in this work from not being able to find any character which can diſtinguiſh it from the *Confervæ*. Indeed it appears to me, as far as my obſervations have hitherto gone, that the ſame may be ſaid of all the *Byſſi filamentofæ*.

C. rubiginosa grows on decayed wood in places where the light is nearly excluded, and forms irregular patches moſtly about an eighth of an inch in thickneſs, and of a ruſty brown color entirely deſtitute of gloſs. The primary filaments I have little doubt are repent, but ſo mixed with the mould ariſing from the decayed wood on which they grow, and afterwards ſo denſely matted and entangled together that it is impoſſible to ſeparate without tearing them, or to aſcertain the nature of the ramification of the plant except towards the ſummits. On examining a ſection of the maſs it appears that from the creeping filaments riſe upright ones which grow twiſted together, and throwing out in every direction and without any regular order, patent flexuoſe branches, every where of equal thickneſs, which are again entangled and matted ſo as to form nearly a ſolid ſubſtance. Under the higheſt powers of the microſcope, diſſepiments are

observable, which divide the filaments into joints in length about equal to four times their thickness. I have not been able to discover the fructification.

In drying it does not adhere firmly to either Glass or Paper.

- A. *C. rubiginosa*, natural size.
- B. Ditto, magnified 3.
- C. Ditto, ditto 1.



Corymbus dipetalus

CONFERVA DISSILIENS.

C. filamentis simplicibus strictis fragilibus, dissepimentis parum contractis plerumque solutis, articulis brevibus, in medio nigro-punctatis.

On Reeds and other aquatic vegetables in a Ditch on Cromlyn Bog, near Swansea.

THIS species, which has not I believe been heretofore described, was first discovered by my friend and draftsman, W.W. Young, in the place above referred to, where it grows in great abundance on reeds and other aquatic plants. The manner of its growth is not so much entangled as in most of its congeners; its color is a dark green; the filaments are remarkably straight and fragile; in length they are mostly from three to six inches, and in thickness less than that of human hair. The dissepiments are slightly contracted, and at these the filaments break, and the parts often remain connected at one extremity in the same manner as in *C. pectinalis*; the joints are in length about half equal to their thickness and on each side, both towards the dissepiment and edge, are of a light green, whilst the middle is of a darker color, sometimes approaching to black, and this dark part at length becomes nearly round, and most pellucid at the center.

C. dissiliens appears to be a link in the chain of submersed algæ, tending to connect *C. pectinalis* with *C. nitida*, *rivularis*, *lucens* and their congeners, from which it before seemed to be widely separated. The present plant nearly approaches the nature and appearance of the latter in many respects, whilst it claims an affinity with the former by its short joints, and the manner in which the filaments break at the dissepiments.

In drying it adheres very firmly to both Glafs and Paper.

A. *C. frangens*, natural fize.

B. Ditto, magnified 1.



Conserva alio rubescens.

CONFERVA ATRO-RUBESCENS.

C. filamentis ramosis striatis, ramis elongatis sub-alternis, ramulis brevibus subulatis fasciculatis; capsulis ovatis pedunculatis.

In the Sea, adhering to Rocks, Stones and Shells.

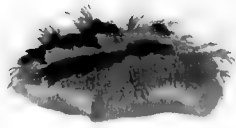
THE present species appears to be far from uncommon on any of our shores, and is occasionally found in large quantities in the basins left by the tide. The length extends from four to six or even nine inches; the color varies from a light purple to a dusky red, and becomes black with age, or by exposure to the air, as well as by drying; the root is a minute callus; the stem solitary, of the thickness of small thread, repeatedly branched; the branches long, for the most part alternate, and irregularly beset with awl-shaped ramuli one or two lines in length, several of which are disposed near each other so as to give them a fasciculated appearance. The whole filament under the microscope is striated in a beautiful manner by longitudinal veins, which arch over at or near the dissepiments, and at first sight appear to form them; these veins are always in some degree spiral: the joints in the principal branches are in length frequently more than double their thickness, but in the ramuli the length and thickness are about equal; the capsules are ovate, and either lateral, on short fruit stalks, or terminal at the end of the smaller branches; other globular substances, imbedded in the joints, are also observable bearing a striking resemblance to the supposed fruit which constitutes the variety β of *Fucus coccineus*, mentioned in the Synopsis of British Fuci, and which, in my opinion, is occasioned by a collapse of the juices.*

* I may take this opportunity to observe, that I have found the globular capsules and this supposed fructification on the same Frond of *Fucus Coccineus*.

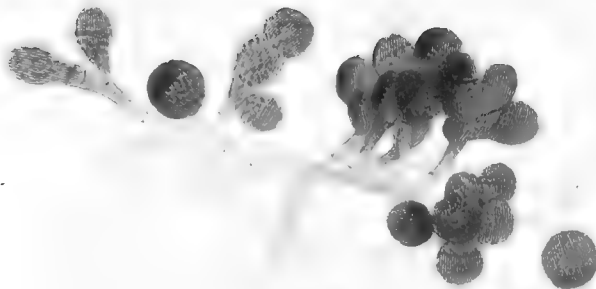
This plant so thoroughly agrees with the description of Hudson's *C. nigrescens* in the *Flora Anglica*, that it is with some hesitation I publish it under another name, but my friend Dawson Turner informs me there are authentic specimens of *that* plant extant, which prove the present to be an entirely distinct species.

The substance is stiff and rather rigid: in drying, the color becomes darker, and the plant adheres to paper, though but very slightly to glass.

- A. *C. rubro-ater*, natural size.
- B. Ditto magnified 2.
- C. Ditto ditto 1.



1



2



3

Conferva multicapsularis.

CONFERVA MULTICAPSULARIS.

C. filamentis minutis repentibus olivaceis, ramis erectis simpliciusculis brevibus, apicem versus incrassatis et capsuliferis; capsulis congestis sphaericis.

On clayey banks in high and exposed situations about Swansea.

FOR the discovery of this singular *Conferva* I am indebted to my friend William Weston Young, who found it growing on several parts of the Town-hill, near Swansea: we have since detected it together in other places in the neighbourhood. It grows on dry clayey banks, in exposed situations, forming small irregular patches, which bear a considerable resemblance to some of the lichens. The color is a dark olive, often approaching to black, and forms a pleasing contrast with the light green of *C. velutina*, among which it is frequently found; the filaments are repent, thickly entangled, and very minute, so that it is impossible to ascertain their length; they throw out a number of sucker-like branches, from which numerous short upright branches arise, for the most part simple, but sometimes once or twice branched; these are thickest towards their apices, and are thus frequently divided into two or more short palmated segments, on each of which a capsule is placed. The joints are very long in the creeping stems; they vary in the upright branches, being shortest at the base and longest towards the summit. When the juices from age have collapsed, or been dried up, the joints appear colorless, and filled with minute, ovate, pellucid granules, which I have also observed in others of the species that grow out of water. The capsules are disposed at the end of the upright shoots without any discernible order: sometimes they are solitary, sometimes in clusters, and, not unfrequently, two or three may be seen apparently issuing from each other; in most of them a

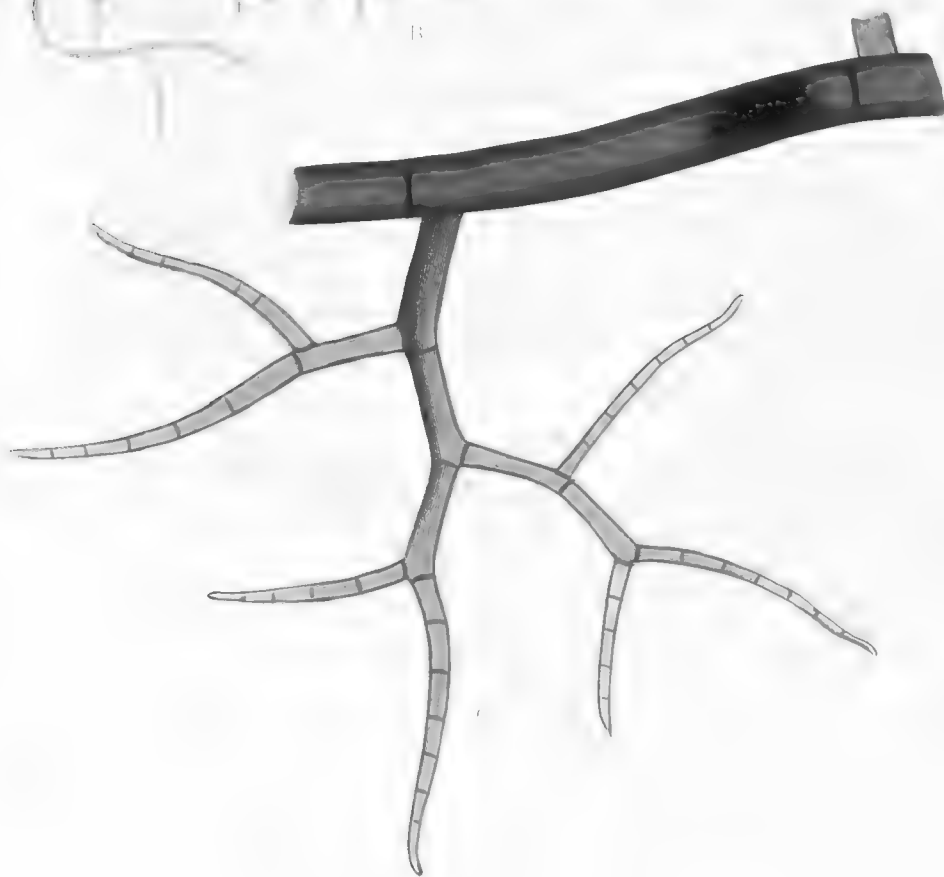
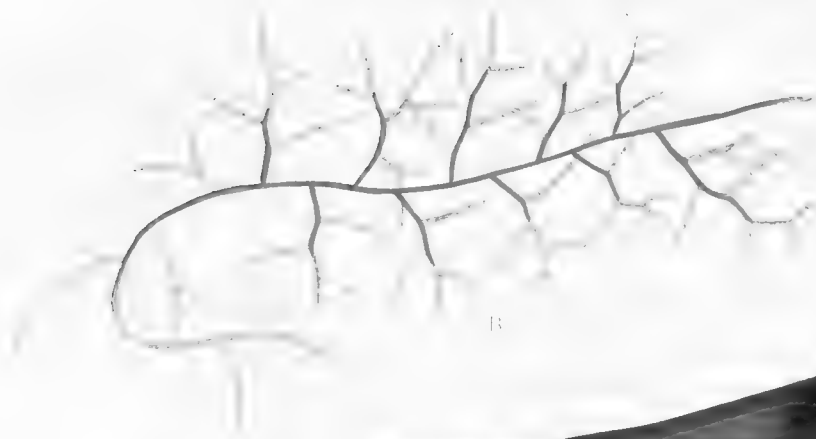
transverse line is observable, at which the capsule divides when at maturity, and the seeds escape at the orifice.

In drying it adheres, though not very firmly, to either glass or paper.

A. *C. multicapsularis*, natural size.

B. Ditto magnified 2.

C. Ditto ditto 1.



Conifera castanea.

CONFERVA CASTANEA.

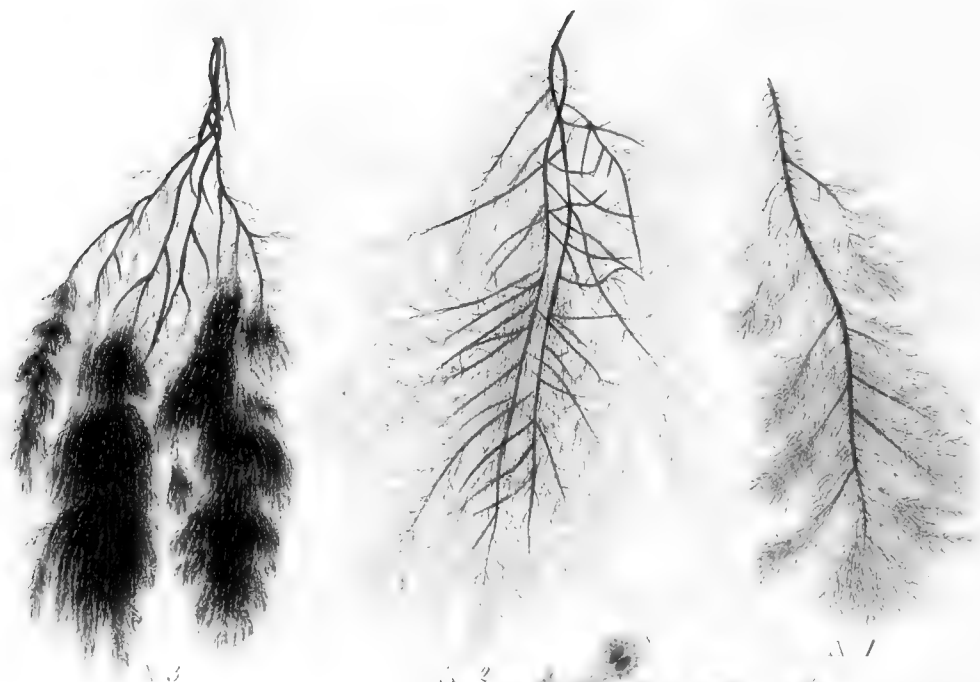
C. filamentis repentibus ramosis sub-bipinnatis imbricatis implexis, pinnis pinnulisque alternis divaricatis, articulis longis.

On hedge banks in a lane on a high hill between the Gower and Lougher Roads, about four miles from Swansea.

THIS singular species is found in great abundance on the shady side of a lane near Swansea, and I am not aware of its having been elsewhere met with. It covers sticks, stones, and earth, forming loose patches of a brown-chestnut color. The stem is creeping, and throws off several bipinnated decumbent branches, about a quarter or half an inch in length, which mostly grow over and become entangled with each other; the pinnæ and pinnulæ are regularly alternate, variously curved, and issue at or nearly at right angles with the stem and branches. The dissepiments are almost black: in the principal branches the joints are very long, but they gradually become shorter towards the ends of the ramuli. No fructification has been discovered.

In drying, the joints alternately collapse, so as to give the plant a singularly beaded appearance; it adheres but slightly to either glass or paper.

- A. C. castanea, natural size.
- B. Ditto magnified 3.
- C. Ditto ditto 1.



Conferva fucoides.

CONFERRA FUCOIDES.

C. filamentis sub-cartilagineis ramosissimis ; ramulis dichotomis, dissepimentis ex venarum anastomosis, articulis breviusculis striatis, capsulis ovatis sub-fessilibus.

C. fucoides. Fl. Ang. p. 603. With. IV. p. 141.

Ceramium violaceum. Roth. Cat. Bot. I. p. 150. III. p. 151. Fl. Germ. III. pars. I. p. 462.

On Rocks and Stones in the Sea frequent.

AMONG the *Confervæ* few are so little known as the black marine species, which may be principally attributed to the shortness of Hudson's descriptions, to his not having had any figures to which he could refer, and to the unfortunate destruction of his Herbarium. The difficulty in the present species has been removed by the kindness of my friends the Rev. Hugh Davies and Archibald Menzies, who, from among some authentic specimens which they fortunately possess, have obligingly spared me two pieces marked '*C. fucoides*' exactly corresponding with the plant here figured, as indeed does the description in the *Flora Anglica* with some of the numerous appearances which it assumes in different situations and periods of its growth.

C. fucoides varies from two or three inches to a foot in length ; its mode of growth is remarkably thick and bushy ; the color in the young plant is of a reddish-brown, becoming darker, and almost black with age ; the root is a callus common to two or three irregular branched stems ; the stem and main branches when the plant has arrived at maturity are in a considerable degree tough and horny ; towards the ends they are repeatedly dichotomous ; the dissepiments, as

in *C. byssoides*, appear to be formed by the arching over of the veins or nerves which are very obvious in the joints; the length of the joints varies; in the stem and principal branches it is three times their diameter, to which, in the ultimate ramuli, it is hardly more than equal; the capsules are ovate, either terminal or lateral; they are mostly sessile, but very short fruit-stalks are sometimes observable.

In drying it adheres but slightly to either glass or paper.

A. 1. 2. *C. fucoides*, natural size.

3. An old specimen of the same, natural size.

B. *C. fucoides*, magnified 4.

C. Ultimate Ramuli with Capsules, magnified 1.



A



B



C

Cerferra rothii

CONFERTA ROTHII.

C. filamentis erectis dichotomis brevibus densissime caespitosis phænicis ; ramis alternis, articulis breviusculis.

C. Rothii. Turton's System of Nature, VI. p. 1806.

C. violacea. Roth. Cat. Bot. I. p. 190, t. 4. f. 1. III. p. 224. Fl. Germ. III. pars. 1. p. 525.

On a Rock by the Sea-shore on the N. E. Coast of Anglesea, between Trofymarian and Penmain Park.—*Rev. Hugh Davies.*

I RECEIVED specimens of the present beautiful species from my friend the Rev. Hugh Davies, who first noticed it in Britain. He informs me, that it grows on a tophus, formed by the constant dripping of fresh water from an impending rock on the north-east side of Anglesea, between Trofymarian and Penmain Park, which is washed by the sea at spring-tides, and in rough weather. It appears to have been first discovered by Dr. Roth, on the piles placed on the shore, near Eckwarden, in the Duchy of Oldenburg. He described it under the name of *C. violacea* in his *Catalecta Botanica*, but as Hudson, in the *Flora Anglica*, had previously taken up a very different plant under that denomination, I have followed Dr. Turton, who, in his System of Nature, has altered its name to that of *C. Rothii*, in honor of its first discoverer.

C. Rothii grows in patches of various sizes, generally, according to Dr. Roth, affecting an oblong form. The color is a bright red, sometimes tending to brown, and changing, when dried, to a beautiful shining crimson ; the filaments are very slender, frequently not more than three lines, and, I believe, never exceeding an inch in length ; they are erect, densely matted together, and much branched ; the

branches dichotomous, alternate, and most numerous towards the apices; the joints are cylindrical, and their length is about equal to twice their thickness; the interstices pellucid. No fructification has been discovered. The Rev. Hugh Davies informs me that he has found this plant both in spring and autumn, but that the color is most brilliant in the latter season.

C. Rothii has a considerable affinity to *C. fetacea* and *C. stricta*, but to the naked eye its much smaller size, and, when magnified, the shortness of its joints will readily distinguish it from both these species

In drying it adheres to either glass or paper.

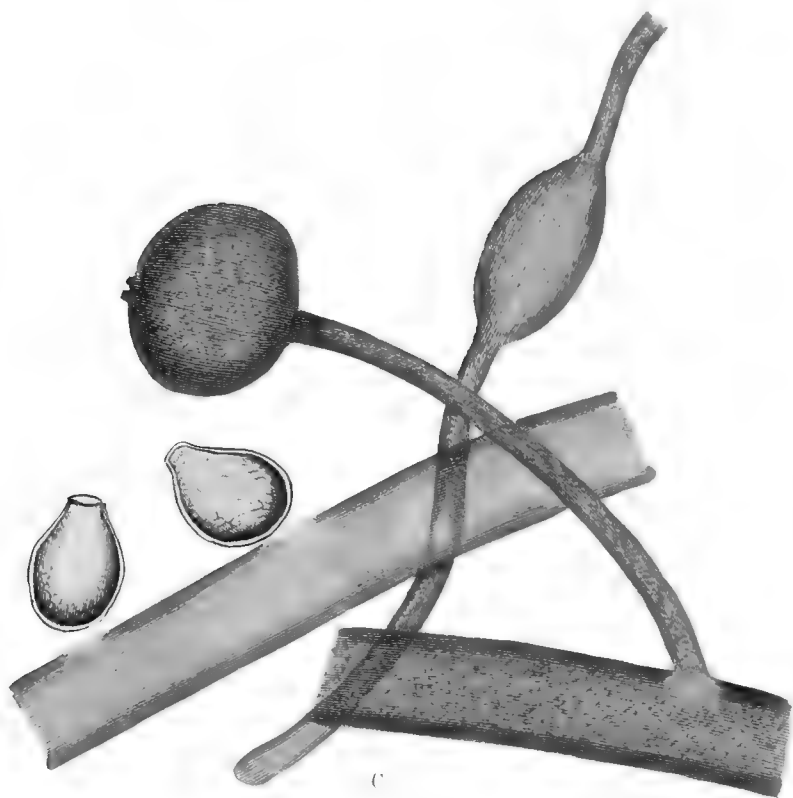
- A. *C. Rothii*, natural size.
- B. Ditto, magnified 3.
- C. Ditto ditto 1.



A



B



C

Conferva vesiculata.

CONFERVA VESICATA.

C. filamentis ramosis sub-articulatis, rigidis, vesiculis innatis solitariis ellipticis, filamento latoribus, capsulis subdidymis pyriformibus, breviter pedunculatis.

C. vesicata. Muller in Nov. Act. Pet. III.

C. burfata? Muller in Nov. Act. Pet. III.

In Fish Ponds at Knowle Park, and in a Stone Trough at the three mile stone on the Pensford Road, near Bristol. *W. W. Young.*

MY Friend W. W. Young brought me the present interesting species from the neighbourhood of Bristol, and it so strikingly agrees with Muller's figure and description, as to leave no doubt of its being his *C. vesicata*. It grows in large bushy masses at the bottom of the water. The filaments are so excessively brittle that it is almost impossible to ascertain their length. They are cylindrical, everywhere stuffed with minute granules which issue from them when broken, and very rough to the touch; the branches are few, disposed at a great distance from each other, and generally from an obtuse angle with the stem. The stems and branches at irregular intervals are frequently swollen into bladder-like vesicles, four or five times broader than the filaments, and bearing a considerable resemblance to those of *Fucus nodosus*. I observed one of their vesicles at the termination of a small branch, as is represented in the figure, but, as Muller observes, I believe these very rarely occur. The disseminations appear very irregularly, though always at a great distance from each other, and towards them the joints are contracted at both ends; the capsules are pear-shaped, lateral, on short footstalks, and delicately reticulated with nerves; they are generally disposed in pairs;

these capsules frequently occur on branches where no vesicles are discernible, and the plant then considerably resembles *C. burfata* of Muller, which my friend D. Turner and myself found many years ago near Yarmouth, and which possibly may not be a distinct species.

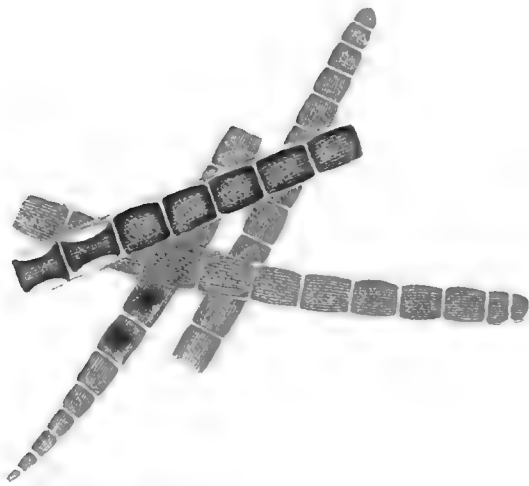
C. veficata agrees so nearly in the nature of the filament, in its ramifications and joints with *C. amphibia* in an old state, that I think it rather doubtful whether future observations may not prove it to be only a variety of that plant. Its brittleness, and rigidity, and under the microscope its singular vesicles will, however, readily distinguish it, and I have therefore thought it best, and the most certain way of avoiding future confusion, to follow Muller, and publish it as a separate species.

In drying it adheres very slightly to either glass or paper.

A. *C. veficata*, natural size.

B. Ditto magnified 4.

C. Ditto ditto 1.



Conferia curta

CONFERRA CURTA.

C. filamentis cœspitosis simplicibus, sub-cartilagineis, erectis brevibus utrinque attenuatis; dissipimentis pellucidis parum contractis; articulis breviusculis.

In the Sea, parasitical on Fuci, not unfrequent at Swansea.

THIS small species, though it does not appear to have been heretofore noticed, is frequently to be met with on the shore at Swansea, and I have reason to believe that it is far from rare in other parts of the kingdom. It grows parasitically on Fuci, and forms roundish tufts so short and stiff that they may be readily passed over as the remaining stumps of a parasite, the greater part of whose filaments have been beaten off by the action of the waves. The color is a brownish olive; the length, I believe, is seldom more than three or four lines. The filaments are simple; towards the root they are very slender, but become thicker as they approach the middle, and then again taper slightly towards their apices, which are rounded off and blunt. The dissipiments are pellucid, and divide the filament into joints, whose length does not much exceed their thickness. No fructification has been discovered.

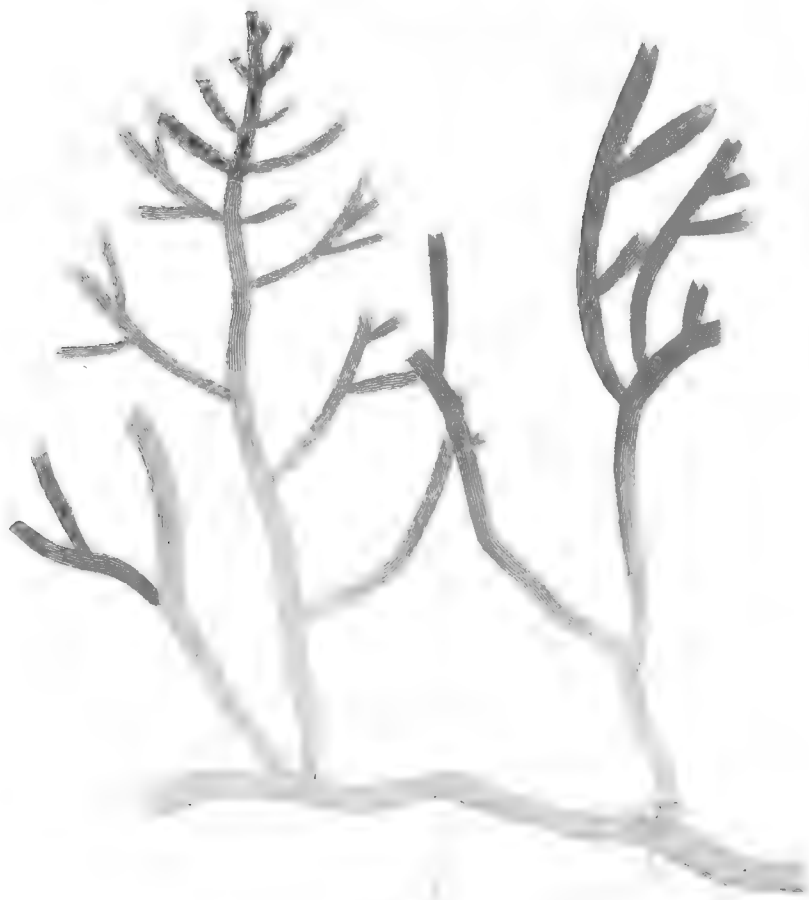
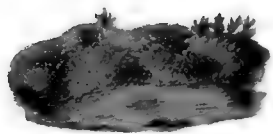
C. curta differs from *C. fucicola*, with which alone it can be at all confounded in the substance and color of the filaments: in the former they are rather of a horny nature and of an olive-brown color; the latter are remarkably flaccid and the color is more of a muddy yellow; the length and shape of the filaments are also materially different.

In drying it adheres to both Glass and Paper.

A. *C. curta*, natural size.

B. Ditto, magnified 3.

C. Ditto, ditto 1.



CONFERVA VELUTINA.

C. filamentis repentibus ramosis implexis, ramis erectis sub-secundis, curvatis, obtusis, articulis longis.

C. velutina. Eng. Bot. t. 1556.

C. varia. Roth. Cat. Bot. III. p. 301 ?

Byssus velutina. Linn. Sp. Pl. p. 1638. Fl. Ang. p. 605. Fl. Scot. p. 1001.
With. IV. p. 144. Weis Crpy. p. 12. Roth. Fl. Germ. III. pars. 1. p. 562.

Byssus tenerrima viridis, velutum referens. Dill. Musc. p. 7. t. 1. f. 14. Ray.
Syn. p. 36.

Byssus terrestris viridis herbacea & mollissima, filamentis ramosis et non ramosis.
Mich. Gen. p. 211. t. 89. f. 5.

On the ground in moist and shady places.

C. VELUTINA grows most frequently on moist shady banks, and I believe is not uncommon in such situations during the winter months and in the early part of spring. It covers the ground with densely matted patches, of a light or yellowish green color, and frequently four or five inches in diameter. The filaments extend to a great length, throwing out roots below and branches from the upper side; these branches are short, erect and matted together, so as to bear a fancied resemblance to the pile of velvet from which the plant has derived its specific name. The branches are again twice or thrice divided with ramuli, for the most part disposed on the same side of the branch, but sometimes alternately; they are more or less curved and blunt at the apices. In the repent stem and principal branches the dissepiments are hardly discernable; the joints vary in length from twice to six or eight times their thickness. Michæli's figure affords good reason

for believing that the fructification resembles that of *my** *C. frigida* figured at Plate 16, but I have not been able to discover it.

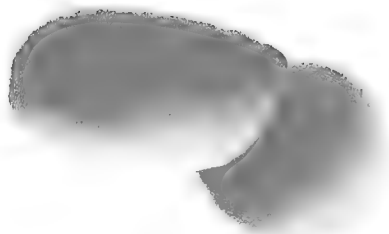
C. umbrofa of Roth, figured at Plate 61 of this work, differs from *C. velutina* in its much darker color and more brittle nature. I however strongly suspect that it is a variety only of this species occasioned by its growth in a colder and boggy soil. The *Conferva* introduced by Dr. Roth in his *Catalecta* and *Flora Germanica* under this name, is an entirely different species, and is the *C. violacea* of Hudson and *C. confragosa* of the *Flora Scotica*.

In drying *C. velutina* adheres to both Glass and Paper.

A. *C. velutina*, natural size.

B. Ditto magnified 1.

* I may take this opportunity to observe that the plant which I have figured under that name is not the *C. frigida* of Roth. Drs. Mohr and Weber, in their German edition of this work, first corrected the error, and their correction is confirmed by the 3d vol. of the *Catalecta Botanica* lately published. The species which I erroneously figured under that name is there described with the name of *Ceramium Dillwynii*.



12

CONFERVA PALLIDA.

C. filamentis dichotomis, curvato-flexuosis, fastigiatis dichotomiarum angulis rotundis, articulis longissimis.

On Yellow Ochre in Iinglafs size.

MY friend W. W. Young, having let some yellow ochre remain about a fortnight in a pot of iinglafs size, found the surface of the ochre nearly covered by the present minute and interesting *Conferva*.

The color is of a light yellowish brown: the filaments are considerably finer than the smallest human hair, and are matted together into dense leathery masses, generally about an inch in length and of the thickness of a shilling; they are much branched with repeated dichotomies of which the angles are uniformly rounded; the branches are singularly flexuose and curved all nearly of the same length, and blunt and of a lighter color at the summits: the length of the joints is irregular, in the ultimate branches they are equal to eight or ten times the diameter, and in the main branches are generally much longer. I have not been able to discover any fructification.

It appears from the description in the *Catalecta Botanica* to be nearly allied to Roth's *Conferva fastigiata*, but in that species the angle of the dichotomy is said to be acute, and the joints very short and somewhat beaded.

In drying it adheres to both Glass and Paper.

A. *C. pallida*, natural size.

B. Ditto, magnified 1.



Conjerva lactea.

CONFERVA LACTEA.

C. filamentis ramosissimis, gelatinosis, lubricis; ramis virgatis alternis e quovis dissepimento; dissepimentis contractis; articulis longissimis, hyalinis.

C. lactea. Roth. Cat. Bot. I. p. 216. III. p. 292.

C. pusilla. Fl. Germ. III. pars. I. p. 524.

In Ditches and Rivulets, growing on Stones, Wood, decaying vegetables, &c.

I HAVE found the present species in several places in Walthamstow and its neighbourhood, as also about Swansea, and I am inclined to think it is by no means unfrequent during the winter months. It grows on various substances at the bottom of ditches and rivulets, in gelatinous slippery masses, of a dirty white color, and varying from half an inch to three or four inches in length. The filaments are regularly branched at each dissepiment; the branches are alternate and so clustered as to give them a brush-like appearance. The dissepiments are of a dusky color, and divide the filaments into joints, whose length is various but never less than at least ten times their thickness, and they are slightly contracted and rounded at each end. Under the microscope they appear perfectly colorless, and this and their remarkable transparency will readily distinguish *C. lactea* from every other species with which I am acquainted. No fructification has been discovered.

In drying it adheres firmly to both Glass and Paper.

A. *C. lactea*, natural size.

B. Ditto, magnified 1.



CONFERVA ÆREA.

C. filamentis simplicibus rigidiusculis strictis; dissepimentis hyalinis contractis, articulis oblongis brevibus.

On Stones in the Sea at Cromer, *D. Turner*. At the entrance of Laugharne Harbor; at Himaël's Ferry, and other parts of the Carmarthenshire Coast, *W. W. Young*. About Swansea.

THIS species, which hitherto appears to have escaped the observation of any author, was, above four years ago, sent by Dr. Goodenough to D. Turner, under the name of *C. Ærea*, and has since been found by my friend W. W. Young on several parts of the Coast of Carmarthenshire; nor is it by any means unfrequent on the shore about Swansea. Several filaments issue from the same root; they vary considerably in size. At the beginning of the winter before last I found one nearly of the thickness of a crow quill, but they are most generally about equal to large thread. They are invariably simple: their length is from six to fifteen inches; the color a dark or bluish green; they are brittle and rigid like *C. capillaris*, but not at all curled or entangled as in that species; the filaments contracted at the dissepiments, which are remarkably pellucid and colorless; the length of the joints is less than their diameter, and two together often appear, whose united length is precisely the same as that of one of the others, as if they had originally formed only a single joint; they are rounded at each end, which gives the filament its beaded appearance. No fructification has been discovered.

When dried the filament assumes a more cylindrical form, and under the higher powers of the microscope longitudinal fibres are observable. It adheres but slightly to either glass or paper.

A. *C. concatenata*, natural size.

B. Ditto magnified 2.



Conferia sericea.

CONFERVA TETRICA.

C. filamentis decomposito-pinnatis, pinnis pinnulifque alternis, extremis curvatis; articulis longiusculis, capsulis sub-solitariis globosis pedunculatis.

On Fuci and on Rocks in the Sea. Common about the Mumbles and in other parts of the Peninsula of Gower.

C. TETRICA is extremely plentiful in the pools left by the tide on the coasts of the peninsula of Gower, where it grows either on the rocks or parasitically on the larger fuci. The root is a small callus from which several stems arise, forming thick entangled bundles of a dull or brownish red color, wholly devoid of gloss, and frequently attaining the length of six or eight inches. The principal stem in thickness is about equal to horse hairs. The primary shoots are disposed without much observable order and of unequal lengths; they are winged with alternate branches, which are again pinnated with others also regularly alternate, and these are beset with short curved ramuli, of which the length is variable but always short in comparison with that of the other branches. The joints are cylindrical; their length in the principal branches is at least equal to thrice their thickness, but it is much less in the smaller ones. The capsules, of which seldom more than one occurs on any of the ramuli, are globose, and placed on a short penduncle.

Although this plant so strikingly differs in its greater size and appearance in almost every respect from *C. rosea*, yet it is not easy to find a specific difference when examined with the assistance of a microscope. The principal difference is then observable in the ultimate ramuli and in the disposition of the capsules; the former in *C. rosea* are of regular lengths and truly pinnated; in *C. tetrica* they are again divided with short curved and somewhat spine-like ramuli. In *C. rosea*

the capfules are numerous, feffile, and regularly arranged on the upper fide only of the pinnulæ, but in this plant they are on fhort footftalks, and feldom more than one is found on each ramulus, and that at or near its fummit. The joints in the principal branches are alfo longer than *C. rofea*.

In drying *C. tetrica* does not adhere firmly to either Glafs or Paper.

A. *C. tetrica*, natural fize.

B. Ditto, magnified 3.

C. Ditto, ditto 1.



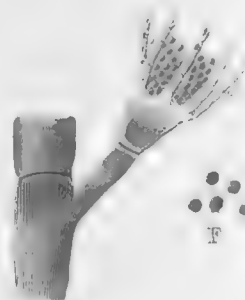
A



B



D



E



F

Cyperus arund.

CONFERVA SETACEA.

C. filamentis sub-dichotomis, fasciculatis, strictis, virgatis, lubricis, ramis articulisque cylindraceis longissimis; fructu laterali pedunculato.

C. setacea. Fl. Ang. p. 599. With. IV. p. 137. E. Bot. XXIV. p. 1689.

C. marina gelatinosa, corallinae instar geniculata tenuior. Dill. musc. p. 33. t. 6. f. 37. Turn. Tr. of Linn. Soc. VII. p. 107.

Corallina confervoides gelatinosa rubens, ramulis et geniculis perangustis, R. Syn. p. 34.

On Rocks and Stones in the Sea, not unfrequent at the latter end of Summer and beginning of Autumn.

C. SETACEA has been observed on most if not all of our shores, though in some it is much more plentiful than on others. Where it inhabits it is almost impossible it should be overlooked, as its rich color must attract the notice even of the most incurious observer. It constantly grows in thick bundles, seldom exceeding four or five inches in length. The root is a small callus and gives rise to a number of rich crimson filaments, generally more or less tinged with purple; they are branched with repeated dichotomies, the angles whereof are uniformly acute; the ultimate branches are long; the joints cylindrical; their length, especially in the main stem, generally eight or ten times their breadth, and every where much longer than in any of its congeners. We are informed in Withering, on the authority of Col. Velley, that the fructification is in globular

clusters on short lateral pedicles, but I* have never been so fortunate as to meet with it. Col. Velley adds that it is rarely found.

The only two species which can possibly be confounded with *C. fetacea* are *C. corallina* and *C. stricta*; from the former it differs in its more slender filaments and cylindrical joints; while its much less numerous branches, far longer joints, veinless filaments, smaller size, and brighter color, will readily distinguish it from the latter.

When this plant is placed in fresh water, a scarlet liquor oozes from the joints; in drying it adheres to both glass and paper. The colour is remarkably fugitive; it changes from exposure to the air to a dirty orange.

- A. *C. fetacea*, natural size.
- B. Ditto, magnified 4.
- C. Ditto, magnified 3.
- D. Part of a fruit-bearing specimen, natural size.
- E. Portion magnified 2.
- F. Seeds magnified 1.

* Since the above was written, Mr. W. J. Hooker has been so kind as to favor me with a sketch of the fruit of this plant from a specimen in my friend D. Turner's collection, communicated to him by Mr. Templeton from the North of Ireland. There is something so extraordinary and anomalous in the fructification, that I am unable to compare it with that of any other submerged alga; the seeds are borne as Col. Velley describes them, but do not appear to be contained in a tubercle, and have a pellucid limbus more striking than in any fucus I am acquainted with. Mr. H. Davies has suggested that this plant, not *C. rubra*, as quoted by Hudson, is the true *C. flosculosa* of Ellis.



1. *Phragmites australis* (Cav.) Trin. ex Steud.

CONFERVA TYPHLODERMA.

C. filamentis sub-ramosis, densissimè implexis, dissepimentis obscuris, articulis brevibus.

In Water which contained a Solution of Gum Dragon.

THE present Conferva was discovered by my friend William Weston Young, in a bottle containing a solution of gum dragon in water, the surface of which it covered with a mass of filaments so densely interwoven as to form a cartilaginous film about two lines in thickness, and bearing a considerable resemblance to the skin of a mole.

Their extreme tenuity and entangled growth makes it impossible to ascertain the length of the filaments, which are generally simple, but a branch may be here and there observed—their color is a dull olive green. The dissepiments are readily discernable, and are of a darker color than the rest of the filaments, which they divide into joints, whose length is nearly but not quite equal to their thickness. No fructification has been discovered.

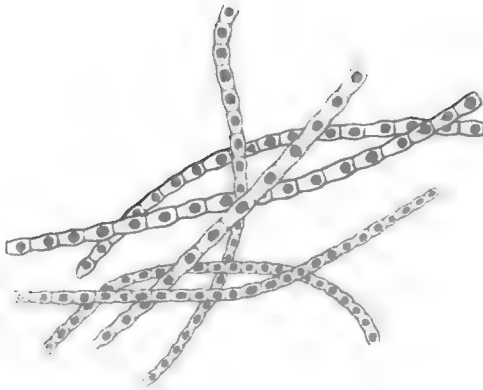
In drying it adheres firmly to both Glass and Paper.

A. *C. typhloderma*, natural size.

B. Ditto, magnified 1.



A



B

Conferva carnosa.

CONFERVA CARNEA.

C. filamentis simplicibus cæspitosis, sub-nodosis, carneis; articulis breviusculis utrinque attenuatis; fuccus in globulos solitarios congestus.

On Conferva in the River near Loughor, Glamorganshire. *W. W. Young.*

IN September, 1805, Mr. Young brought me the present delicate species from the rocks in the Loughor river, where he gathered it, near to its confluence with the sea. It grows on other confervæ, in loose tufts, mostly from a quarter to half an inch in length, and of a pale red or flesh color. The filaments are simple, and taper in some degree both towards their root and apex, but terminate rather bluntly. The dissepiments are of a dark color, and at regular distances from each other; the length of the joints in some filaments is about equal to twice their diameter; and in others the length and diameter are nearly equal. They are rounded off at both extremities, and most swollen towards the upper, so that when examined under the higher powers of the microscope they bear some resemblance to those of *Corallina officinalis*. Among a number of young and apparently vigorous specimens which Mr. Young examined, while they were quite fresh, he could not find one joint through which the juices were entirely diffused, and of which the greater part was not colorless, so as to induce him to believe that the red globules, of which one appears in each joint, are not the effect of a collapshon of the juices from age or exposure to air, but natural to the plant in its most perfect state; in some specimens however which I examined when nearly fresh, I found that in the older filaments the red spot was considerably smaller in proportion to the size of the joint than in the younger ones, and I therefore presume that they proceed entirely from a collapshon of the juices, which probably takes place in this more quickly than in most other species. I have not been able to discover the fructification.

There is no danger of its being confounded with any other species.

In drying it adheres to both glass and paper.

A. *C. carnea*, natural size.

B. Ditto, magnified 1.



Conifera arbuscula.

CONFERVA ARBUSCULA.

C. filamentis primariis incrassatis, inarticulatis, infernè denudatis, supernè ramossissimis; ramulis confertis, subverticillatis, abbreviatis, ramosis, articulatis; articulis cylindraceis brevibus.

On submerged calcareous Rocks near Ballycastle, North of Ireland, *Mr. Brown*. Bantry Bay, *Miss Hutchins.*

AMONG the various additions that have of late years been made to the list of British *Confervæ*, there is probably no species more beautiful or interesting than the present, which was discovered by Mr. Brown, so long since as 1800, in the habitat above mentioned. I find no traces of it in the works of any botanical writer upon the genus, nor have I ever met with any specimens besides those gathered by Mr. Brown, (to whom I am indebted for that here figured) except a single one found by Miss Hutchins, and preserved in the beautiful collection of my friend, Dr. Scott, of Dublin.

The root of *C. arbuscula* is, like that of most other species, a small callous disk, from which the filaments, as far as I have seen, arise in general singly. Their height is about three or four inches. The leading shoot, or stem, (if I may use the expression) is as thick as packthread; nor, either in this, or the principal branches, have I been able to detect any traces of joints. It is naked and undivided near the root, at a short distance from which it throws out branches, disposed without any regular order, and much more closely arranged in some specimens than in others, the lower ones generally longest, and the rest gradually shorter, so as to give the whole plant an irregularly ovate outline. These branches are, like the stem, naked near their base, and either simple or again divided, closely beset towards their apices with extremely short clustered

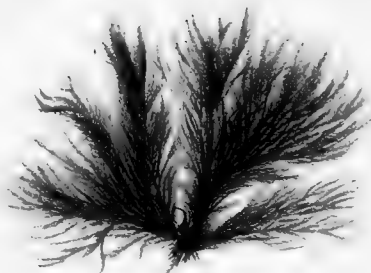
ramuli, disposed in a subverticillate manner, irregularly branched, and very visibly jointed, with cylindrical joints, of which the length is about equal to the diameter. The colour of this species when fresh appears to be a beautifully deep-red brown; when dry it turns to a very dull brown, tinged with green, wholly devoid of gloss; and the plant at first sight more resembles a battered specimen of *C. spongiosa* infested with some minute parasite than any other *Conferva*. It adheres either to paper or glass.

The specific name of this plant was given by Mr. Brown, and is excellently descriptive of its mode of growth and general habit, which are not unlike that of many specimens of *Hypnum alopecurum*. T.

- A. *Conferva arbuscula*, natural size.
- B. Summit of a branch, magnified 5.
- C. Portion of ditto 4.
- D. Ramulus 1.



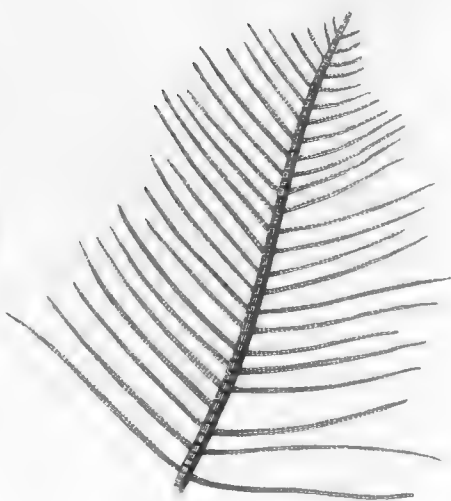
A



E



C



B



F



D

Conifera juniper.

CONFERVA PENNATA.

C. filamentis ramosis; ramis pinnatis; pinnulis sub-oppoſitis ſub-horizantalibus, approximatis, ſtriſtis, diſſepimentis obſcuris, articulis brevibus, tuberculis ſeffilibus ſphæricis.

C. pennata. Fl. Ang. p. 604. With. IV. p. 142.

C. marina pennata. Ray, Syn. p. 59.

In the Sea, on Rocks, Fuci and Corallines. Common in Ireland, *Dr. Scott.* At Brighton, *Mr. Borrer.* Iſle of Wight, and Devonſhire and Corniſh Coaſt, not unfrequent, *D. Turner.* In Angleſea, *Rev. Hugh Davies.* About Scarbro'. *Travis.* Near Forres in Elginſhire, *I. Brodie, Eſq.* On the Mumble Rocks near Swanſea.

THE preſent ſpecies, though far from uncommon, appears to have been remarkably ill underſtood in general, and confounded by moſt Botanists with ſmall varieties or broken pieces of *Conſerva ſcoparia.* Dr. Roth in the ſecond Faſciculus of the *Catalecta Botanica* has referred it to his *Ceranium pennatum*, but in the third Faſciculus he corrects this error, and carries it properly to his *C. cirroſa*, with the deſcription of which it does not however altogether accord.

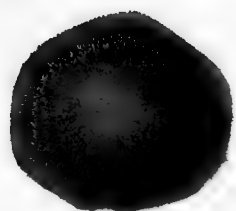
C. pennata ſometimes grows on rocks, but moſt frequently on fuci or corallines, in buſhy tufts varying from half an inch to two inches in length; the color is olivaceous, becoming brown with age; the ſtems are twice or thrice branched, but excepting the ultimate ſeries the branches can hardly be called pinnate; the pinnæ, which are long and ſomewhat thorn-like, iſſue almoſt at right angles from the branches; their moſt natural diſpoſition appears to be oppoſite, and in ſome plants two of them regularly iſſue from each alternate joint, but in this reſpect they are liable to great variation; the diſſepiments are

of a dark color, and divide the filaments into joints, whose length does not exceed their thickness. The fructification which is drawn at F. from a dried specimen in the Herbarium of my friend D. Turner, consists of globular sessile capsules on the branches.

For some time I had considered the plant figured at C. as a distinct species, and have distributed a few specimens of it under the name of *C. halecina*. In this opinion I was joined by my much lamented friend the late Col. Velley, who had gathered it near Weymouth, but I have since seen some specimens in which the branches from the same root have so materially varied in the disposition of their ramuli, as to convince me that it is a mere variety of the present species. In this state it approaches some of the varieties of *C. littoralis*, but may be readily distinguished by its divaricated ramuli and more rigid nature. The specimen figured at B. was sent me by my highly respected friend James Brodie, Esq. M. P. who gathered it near Forres in Elginshire; where as also in other parts of the North, the pinnæ appear to be generally more regularly disposed, than in the Southern parts of Britain. In Ireland the plant attains a larger size than in England, as may be seen by the drawing at E. for which, and for that at F. I am indebted to the pencil of W. I. Hooker, Esq. of Norwich.

In drying it adheres, though not very firmly, to both glass and paper.

- A. *C. pennata*, natural size.
- B. Ditto, magnified 3.
- C. Variety of ditto 3.
- D. *C. pennata*, 1.
- E. Irish specimen, natural size.
- F. Specimen in fruit, magnified 2.



Conferva acuminata.

CONFERVA ÆGAGROPILA.

C. filamentis ramosissimis, e centro progredientibus, globum constituentibus; ramis ramulisque subsecundis strictis, obtusis; articulis longis, cylindraccis.

Linn. Sp. Pl. p. 1637. Fl. Suec. p. 436. Fl. Ang. p. 604. With. IV. p. 142. E. Bot. XX. p. 1377. Roth, Cat. Bot. I. p. 181. II. p. 212. III. p. 244. Roth, Fl. Germ. III. p. 517. Weber et Mohr Iter Suec. p. 71. t. 1. f. 7. a. b.

In Alpine lakes in North Wales, *Rev. H. Davies*. North of Scotland, *Mr. Brodie*. Prestwick Car, Northumberland, *Mr. Winch*. Culmery Pool, and Whitemere, Shropshire, *Rev. Mr. Williams*.

THE present species, and *Conferva Arbuscula*, I saw so little probability of being able to procure in a fresh state, that I have ventured, with respect to them, to deviate from my original intention, by giving representations of specimens that had previously been dried; for which I trust I shall not be blamed, as the British Catalogue can scarcely boast two more interesting individuals, or two without which a work on the Genus would be less complete.

Conferva Ægagropila is a native of mountainous lakes in different parts of Europe, having been found in Sweden, Norway, and both the North and South of Germany. Dr. Roth has enumerated three varieties, of which I am not aware that more than one has hitherto been met with in England. Its size is uncertain, varying from that of a pea to a large walnut. The filaments always originate from a center, and extend with repeated ramifications to the extremities, preserving an equal height, so that the form of the whole plant is constantly globular, in which, as far as my knowledge extends, no other species

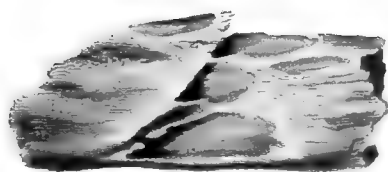
of *Conferva* resembles it. No root, however, has yet been detected, nor any solid body within the mass, to which the filaments might originally have been attached. The mode of ramification seems somewhat uncertain, but the branches and ramuli are principally disposed on one side; they are always straight, and their apices are regularly obtuse. The length of the joints is about equal to three times their diameter; in a recent state they are perfectly cylindrical; but, when dried, the green matter collapses as in most others of this tribe, and never afterwards recovers itself by immersion. The colour of this plant is a dark, but pleasant, green, destitute of gloss. In drying it does not in the least adhere to either glass or paper. It is sufficiently known that it derives its specific name from its resemblance to the hairy balls found in the stomachs of goats. For the specimen here figured I am indebted to my excellent friend, Mr. Brodie.

Many Botanists have been led into error respecting *C. Ægagropila*, from the circumstance of fragments of *C. capillaris* being occasionally found rolled up by the tide so as greatly to resemble that species at first sight, though it can scarcely be necessary to say that the difference may immediately be detected on looking more closely at them. Of these I have seen vast numbers at different times on the shores of the river at Yarmouth, but they are by no means of frequent occurrence. Is it possible that *C. Ægagropila* itself should derive its globular form from a similar circumstance? *T.*

A. *C. ægagropila*, natural size.

B. A branch, magnified 4.

C. A portion of ditto 2.



Conifera jilusjithorea

CONFERRA PHOSPHOREA.

C. filamentis brevissimis ramosis, adscendentibus, densissimè in crustam uniformam implexis, violaceis; dissepimentis obsoletis, articulis longiusculis.

Byssus phosphorea. Sp. Pl. p. 1638. Fl. Ang. p. 605. Fl. Scot. p. 1000. With. IV. p. 143. Fl. Germ. 564.

Auricularia phosphorea. Sowerby's English Fungi. III. f. 350.

Byssus lanuginosa violacea lignis adnascens. Ray. Syn. p. 56. Dill. Musc. p. 54. t. 1. f. 6.

Byssus purpurea delicatissima, arborum corticibus adnascens, brevissimis & tenuissimis filamentis. Mich. Gen. p. 211. t. 90. f. 3.

Byssus cœrulea cœspitosa crispa. Hall. Hist. p. 2102.

Fungus violaceus herpatis modo lignis irrepens. Ray. Hist. III. p. 23.

On decaying wood.

THE *Byssi* filamentosæ, most of which I have had an opportunity of examining, so nearly resemble each other in structure and mode of growth, that the same reasons for which *aurea* and *purpurea* were transferred to the *Confervæ*, will equally apply to them all, though probably to none less than to the present species, which it is not without considerable reluctance that I admit among the *Confervæ*, regarding it as a plant with the true history of which we are at present very little acquainted. Mr. Sowerby has classed it among the *Auriculariæ*, and observes that in its most perfect state it seems to belong to that tribe, in which opinion he may possibly be correct, as I have myself seen specimens of which the edges were of a pale straw color like many of those Fungi, and inclined to



curl off the wood they grow upon. At the same time as no author has noticed it in the state in which it is here represented, I feel a pleasure in probably contributing to throw some light upon it, and I leave it to future naturalists to determine its place in the system.

I received the specimen from which the present drawing was made from my friend T. W. Dyer, Esq. who gathered it in Somersetshire. It grows on decaying wood, in patches of various sizes, and of a beautiful and vivid violet color, which is permanent many years after it has been dried. The filaments are so extremely short and much interwoven that the patches to the naked eye greatly resemble the crust of a lichen, but their filamentous nature is in most specimens* observable with the assistance of a common glass. The minuteness is such that it is impossible to separate them, so as to ascertain the precise length or the frequency of their ramifications, but I apprehend the former rarely exceeds half a line, and that there are seldom more than one or two branches on each filament. The dissepiments are by no means so easily discerned, or so regular as in *C. purpurea*, but are here and there observable, and divide the filaments into joints, of which the length exceeds the diameter. No fructification has been discovered.

A. *C. phosphorea*, on decaying wood, natural size.

B. *C.* magnified 1.

* I have examined some specimens in which I could not detect them at all, and I therefore feel some doubt whether they may not be peculiar to a certain age or state of the plant.



Conifera orthotriche.

CONFERVA ORTHOTRICHI.

C. filamentis cœspitosis, pulvinatis, rigidiusculis, fragilibus, ramosis ; ramis sub-alternis, obtusis ; articulis brevibus, diametrum vix superantibus.

C. muscicola. E. B. XXIII. t. 1638.

On trees in the New Forest, Hampshire, growing on *Orthotrichum striatum*.

C. Lyell, Esq.

THE name of *C. muscicola*, given to this species in English Botany, having been previously bestowed upon a very different plant in Dr. Weber and Dr. Mohr's admirable Swedish Tour,* and subsequently in Dr. Roth's *Catalecta Botanica*, I have been under the necessity of adopting a new one, and have with the concurrence of Dr. Smith, taken that of *C. Orthotrichi*, as the plant has at present been found upon no other tribe of mosses. For the specimen here figured I am indebted to Mr. Sowerby, to whom it was sent by Mr. Lyell, the only person who appears to have yet found it in England, except indeed, as I suspect, the curled appearance of *Orthotrichum striatum*, mentioned in the *Muscologia Hibernica* as the variety β , should prove to be the beginning of it.

C. Orthotrichi grows in very thick entangled tufts on the upper branches of mosses, having its roots in the leaves and stem, which it often so completely covers as to leave scarcely any part of them visible. It is of a rich chestnut color, dull and without gloss when dry. The filaments are not above two or three lines high, erect, repeatedly branched ; the branches generally disposed at some

* *Reise durch Schweden*, p. 60. t. 1. f. 3. The *Conferva* here figured so nearly resembles the *C. cassanea* of this work, that I am apprehensive they are not distinct, and I am sorry I was unacquainted with Dr. Mohr's plant when I published my own. Before, however, I consider them as certainly the same, I shall hope for specimens from that able botanist.

distance from each other, in an irregularly alternate manner, short, blunt, simple, issuing from the stem at obtuse angles, and pointing upwards. The joints throughout the whole plant are uniform, their length scarcely greater than their breadth, and with somewhat of a beaded appearance. These circumstances will be sufficient always to distinguish it from *C. castanea*, t. 72, to which at first sight it bears a strong resemblance. Great care is necessary not to confound either of these plants with the radicles, which shoot out of the stems of most species of mosses that grow in moist places, and are particularly abundant on *Bartramia fontana* & *Bryum palustre*. *C. Orthotrichi* is also very nearly allied to *C. Acharii* & *C. rubicunda* of Roth, the latter of which may probably be the *C. ilicicola* of English Botany.

The texture of *C. Orthotrichi* is rigid and brittle; and in drying it adheres neither to glass nor paper. T.

A. A stem of *Orthotrichum striatum* nearly covered with *C. Orthotrichi*, natural size.

B. Summit of ditto, magnified 6.

C. Leaf ditto 5.

D. Ditto ditto 4.

E. *C. Orthotrichi*, separate 1.



Cladophora peltata

CONFERRA PELLUCIDA.

C. filamentis erectis, stricis, ramosissimis; ramis plerumque ternis, obtusis; articulis cylindraceis diametro quintuplo longioribus.

C. pellucida. Fl. Ang. p. 601. With. IV. p. 139. E. B. XXIV. f. 1716.

C. prolifera β . tenuior. Roth, Cat. Bot. III. p. 247.

On rocks, and stones in the sea in Devonshire, Cornwall, Suffex, and Hampshire.
Hudson. On the beach at Yarmouth.

THIS *Conferva*, though said by Hudson to be a native of so many counties, does not seem by any means a common species, and is certainly one of those which are least understood by modern botanists. How far Dr. Roth is right in referring it as a variety to his *Conferva prolifera* is a point I can by no means attempt to decide, as that plant is not a native of the British shores, and every person acquainted with this tribe must be aware how impossible it is to speak with confidence from dried specimens. I rather incline, however, from their different habits to think he is mistaken.

The root of *C. pellucida* is a small disk, from which the filaments rise in general single; simple and naked at their base, but soon becoming branched, and afterwards so repeatedly divided, that the appearance of the plant towards the apices is remarkably bushy. Their length is six or eight inches; their texture stiff, wiry, and elastic when fresh, but soon turning flaccid; their color a remarkably pleasing, pale, subdiaphanous green, which is permanent even after drying. The branches are chiefly ternate, though sometimes opposite, or even alternate; very straight; between erect and patent; the apices bluntish. The length of the joints is about five or six times greater than their breadth; they are either quite

cylindrical, or very slightly inflated upwards: the dissepiments are dark and narrow in a recent state, but, as the plant decays, grow pellucid, from the collapsing of the juices.

For the drawing of this plant, as well as of the following, *C. Orthotrichi*, I am indebted to my friend, W. J. Hooker, Esq.

In drying it does not adhere at all to glass, and very slightly to paper. *T.*

- A. *Conferva pellucida*, natural size.
- B. A small branch, magnified 5.
- C. A part of ditto 3.



Opuntia chrysantha

CONFERRA CHALYBEA.

C. filamentis pulvinatis, ramosis, tenuissimis, strictis, erectis, fastigiatis ; ramis sub-alternatim secundis, adscendentibus, obtusis ; articulis cylindraceis, longis.

C. chalybea. Roth. Cat. Bot. III. p. 286. Tab. 8. f. 2.

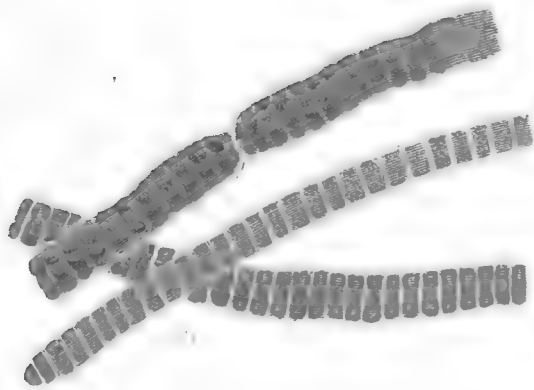
On Flints in Winterbourne Stream at Lewes, Suffex. *Wm. Borrer, jun.* Esq.

PROFESSOR Mertens first discovered the present delicate species in the neighbourhood of Bremen, and communicated it to Dr. Roth, who has published it with a good figure in the third volume of his *Catalecta Botanica*.—Mr. Borrer has since added it to the British Flora, having found it in Winterbourne Stream at Lewes, Suffex, and to him and Mr. Turner I am indebted for the specimen here figured. It grows on *flint-stones* in little tufts about a quarter of an inch in length, and of a blackish-green color, glossy when dry. The filaments, which are repeatedly branched, are erect, straight, of equal height, and very flaccid and slender throughout. The branches are placed at uncertain, generally considerable, distances from each other ; and issue from the stem so as to form an obtuse angle, but immediately curve inwards, and then rise in a more or less upright direction ; their disposition is far from regular, but they are frequently disposed on opposite sides in alternate parcels of two or three. The ramuli are always placed nearer to each other than the main branches, and I have frequently observed more than one proceeding from the top of the same joint ; they are blunt at their apices ; the dissepiments are readily observable with a microscope, and divide the filaments into perfectly cylindrical joints, of which the length is generally from four to six times greater than the diameter.

C. chalybea is most nearly allied to *C. vivipara*, but the description and figure here given will sufficiently prove it distinct.

In drying it adheres to both glass and paper, and more readily revives when immersed in water than most other species.

- A. *C. chalybea*, growing on a flint, natural size.
- B. ditto magnified 3.
- C. ditto ditto 1.



Coronula fusca, rugosa

CONFERRA FUSCO-PURPUREA.

C. filamentis simplicibus, tenuissimis, rectis, sub-fasciculatis, ætate inæqualiter torosis; articulis brevibus utrinque sub-pellucidis, demum serie globulorum cinctis.

On lime-stone rocks in the sea about high water mark in the neighbourhood of Dunraven Castle. *W. W. Young.*

FOR the discovery of this *Conferva* I am indebted to my friend, W. W. Young, who found it growing with *C. Rothii* and another species not yet described, on the lime-stone rocks, a little below high water mark, in the neighbourhood of Dunraven. It may be worth remarking that these rocks which produce several *Confervæ*, that we have not been able to find on the Mumbles or other lime-stone in the western parts of the County, are of a different sort of lime-stone, and of that kind which I am informed is usually called *lias stone*, and are similar in quality to those of which large quantities are exported from Aberthoir, and used for the same purposes as Dutch terrace. This and many other observations which I have made strongly tend to confirm the opinion of my friend Dawson Turner,* that the roots of the marine *Algæ* are not merely intended by nature to fix them to their places of growth, but that they are also useful as organs of nutrition, although the hardness of the substances on which many of these plants grow has led many botanists to suppose the contrary.

Mr. Young informs me that *C. fusco-purpurea* frequently grows in very large patches, so as to cover the rocks for two or three square feet, and gives them a very shewy appearance with its glossy hue and purple-brown color. The filaments are quite simple, straight, rather entangled in their growth, and in length

* Synopsis of British Fuci. Intr. p. 16. & 23.

I believe seldom exceed an inch; when young their thickness is regular, but with age they swell so as in some places to be twice as thick as in others. The diffipiments are so extremely slender that they can only be observed with the higher powers of the microscope. The joints are in length but about half equal to their thickness; they are nearly pellucid on each side towards the diffipiments, and when the plant is old the juices collapse into globular granules, of which three are usually disposed transversely in each joint, though sometimes a single one occupies the whole. *C. fusco-purpurea* approaches in many respects to *C. Curta* and Roth's *C. atro purpurea*, but in the latter species the juices are said to collapse into a double row of granules, and the size as well as the place and mode of growth are very different, and from the former it is distinguished by the color and texture of the filaments, and still more effectually by the shortness of the joints.

In drying it adheres very firmly to both glass and paper.

- A. *C. fusco-purpurea*, natural size.
- B. filaments of ditto, magnified 1.



Coniophora crispata.

CONFERVA CRISPATA.

C. filamentis ramosis densissimè implicatis, crispatis; ramis alternis remotissimis; articulis cylindraceis longitudine diametrum multoties superantibus, siccitate alternatim compressis.

C. crispata. Roth. Cat. Bot. I. p. 178. III. p. 275. Flora Germanica. III. pars. 1. p. 508.

In ditches and pools, about Newton Nottage, Glamorganshire. *W. W. Young.*
Also about London and Yarmouth.

I HAVE gathered *C. crispata* in the neighbourhood of London and Yarmouth, and Mr. Young has brought it from the vicinity of Newton Nottage, but I do not think that it is of such frequent occurrence as most of the other species. It generally grows in stagnant water, and floats in large entangled masses on the surface. The filaments are of a dark green, wholly destitute of gloss, and from six or eight inches to a foot in length; they are repeatedly divided in a somewhat dichotomous manner by alternate branches, which are always disposed at a great distance from each other; the joints are cylindrical, and in length many times greater than the diameter. In the older plants, the sporangium, or internal tube, which contains the granular substance, supposed by Dr. Roth to be the seeds, frequently contracts spirally. This appearance is not however sufficiently general to authorize its introduction into the specific character, as Dr. Roth has done in the first and second, but very properly omitted to do in the third fasciculus of his highly interesting *Catalecta Botanica*. When dried the joints become alternately compressed.

The dissimilar mode of ramification, and length of the joints readily distinguish this species from *C. fracta*; and from *C. amphibia* β , to which it bears most resemblance, it may be at once known by its far different joints.

In drying it adheres, though not firmly, to either glass or paper.

A. *C. crispata*, natural size.

B. ditto magnified 1.



Claytonia perfoliata

CONFERVA FENESTRALIS.

C. filamentis repentibus minutissimis, tenuissimis, ramosis, centrifugis : ramis plerumque divaricatis.

C. fenestralis, Roth, Fl. Germ. III. pars I. Cat. Bot. II. p. 161. III. p. 180.

On Glafs.

I OBSERVED that several of the pieces of glafs on which I preserve my *Confervæ*, and which had lain in a damp place were covered over with a very minute mucor-like down, which on examination in the microscope I found to accord so nearly with the description of Roth's *C. fenestralis*, that I feel no hesitation in publishing it as that species. The filaments are of a light grey, inclining to ash color, and so minute that the glafs on which it grows has rather the appearance of being soiled than covered by vegetation; it adheres to the dried *confervæ*, or some minute substance which may mostly be observed about the roots; from this as a centre numerous filaments issue in all directions; they are usually from about two to four lines in length, and when they meet with any proper substance strike root, and throw out other filaments in the same way. The branches are numerous, and generally divaricate, but the mode of ramification is very irregular, some of the branches being alternate, some opposite, and three or four are not unfrequently disposed without interruption on the same side. Diffipiments may be occasionally distinguished, dividing the filaments into joints, of which the length is generally about thrice greater than the diameter. The fructification is unknown, but may probably consist in some granules, which are often observable on the branches. In drying *C. fenestralis* undergoes no change. The drawing was made with the highest power of a compound microscope; the extremely small size of the filaments rendering the plant almost invisible to the naked eye, and consequently precluding the possibility of figuring it in its natural state.



Coniferia pusilla

CONFERVA FUSCA.

C. filamentis ramosis venosis, ramis distantibus sub-alternis; ramulis patentibus clavatis; articulis breviusculis, medio fasciatis; capsulis sub-globosis.

C. fusca. Fl. Ang. p. 602. With. IV. p. 141.

On Rocks and Stones in the Sea. Anglesea. *Rev. Hugh Davies.* At Newton Nottage, Glamorganshire. *W. W. Young.* At the Worms Head, and other places in the extremity of Gower.

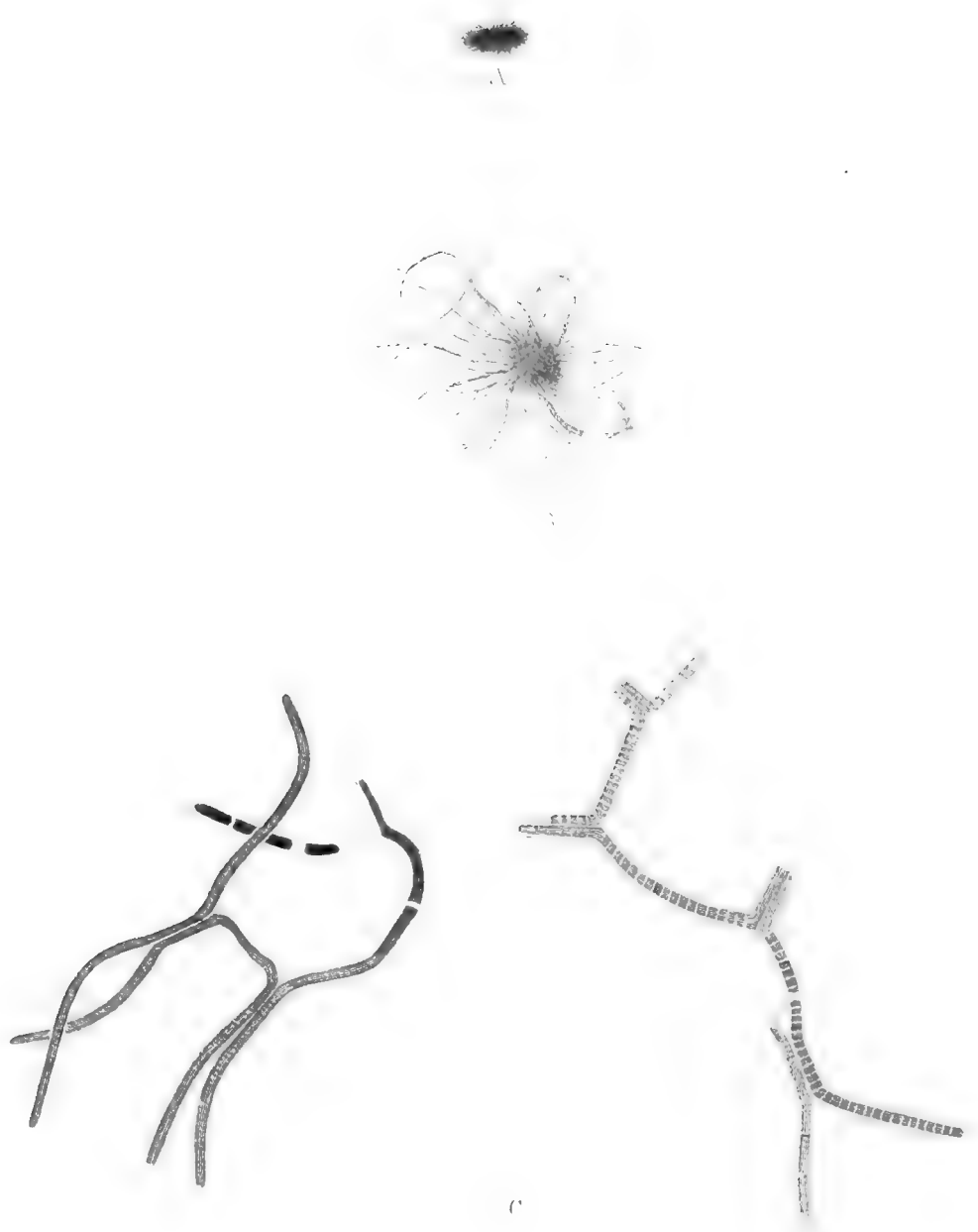
I RECEIVED a small specimen of the plant here figured from my friend the Rev. Hugh Davies as the *C. fusca* of the Flora Anglica, and I conceive that this gentleman's well known accuracy, and former intimacy with Hudson, will prove my sufficient justification for publishing it as such, more especially as the description in that Work applies better to this than to any other species with which I am acquainted. I however confess that in so doing I feel some hesitation arising from the uncertainty that must attend the elucidation of Hudson's dark-colored marine species, which has already been mentioned in the description of *C. fucoides*.

C. fusca grows in tufts from three to five inches long, and varying in color from a dull to a reddish brown. The filaments are numerous from the same root, and generally repeatedly branched. The branches long, remote, most commonly alternate, and often beset with short club-shaped ramuli, which generally form a greater angle with the branches than is formed by the branches with the stem. Mr. Young brought me a few half grown specimens from Newton, in which the branches were much less numerous than in those I gathered in Gower, and I believe the plant is subject to considerable variation in

this respect. The length of the joints but little exceeds their diameter; under the microscope they appear of a light brown with a transverse band in the middle, which nearly disappears when the juices have collapsed by drying. The capsules are globose, rather small for the size of the plant, and are sometimes raised on short fruit stalks.

In drying it does not adhere firmly to paper, and still less so to glass.

- A. *C. fusca*, natural size.
- B. Ditto magnified 3.
- C. Ditto ditto 1.



Coniferia macrobilis.

CONFERVA MIRABILIS.

*C. filamentis spurie-ramosis, cylindricis, cœruleo-virescentibus; ramis e
coadunitis genuflexuris filamentorum; articulis brevissimis.*

On Stones, and the Stems of *Hypnum ruscifolium* in the Stream which runs
through the Wood at Penllergare, near Swansea.

THOSE Species to which Vaucher has given the generic name of *Oscillatoria*, and which he has placed among the *Tremellæ*, are arranged as *Confervæ* by Dr. Roth, and form the division 'sporangium annulis' in the *Catalecta Botanica*. To this division the present plant belongs, but it does not appear to have been heretofore described, and it differs so singularly from all its congeners as to induce me to give it the specific name of *mirabilis*. I discovered it intermixed with *C. decorticans* in the above-mentioned stream, and also attached to the stems of *Hypnum ruscifolium*, but in such small quantity that although I have repeatedly searched for it, I have not been able to obtain more than five or six specimens.

C. mirabilis grows in small thickly entangled patches, of which the diameter in the largest of my specimens does not exceed half an inch. The color and size of the filaments, and the size and nature of the joints entirely resemble those of *C. distorta*; and it is only by their different modes of growth, or with a glass of sufficient power to discover the singular connection of its filaments, that it can be readily distinguished from this species. The manner in which the filaments anastomose is not similar to that of *jugal*is, and the other species of Vaucher's genus *conjugata*, as there is no appearance of the connecting tubes, so striking and singular in those species. It is remarkable for having altogether the look of a branched plant, though at the same time it is in reality completely simple,

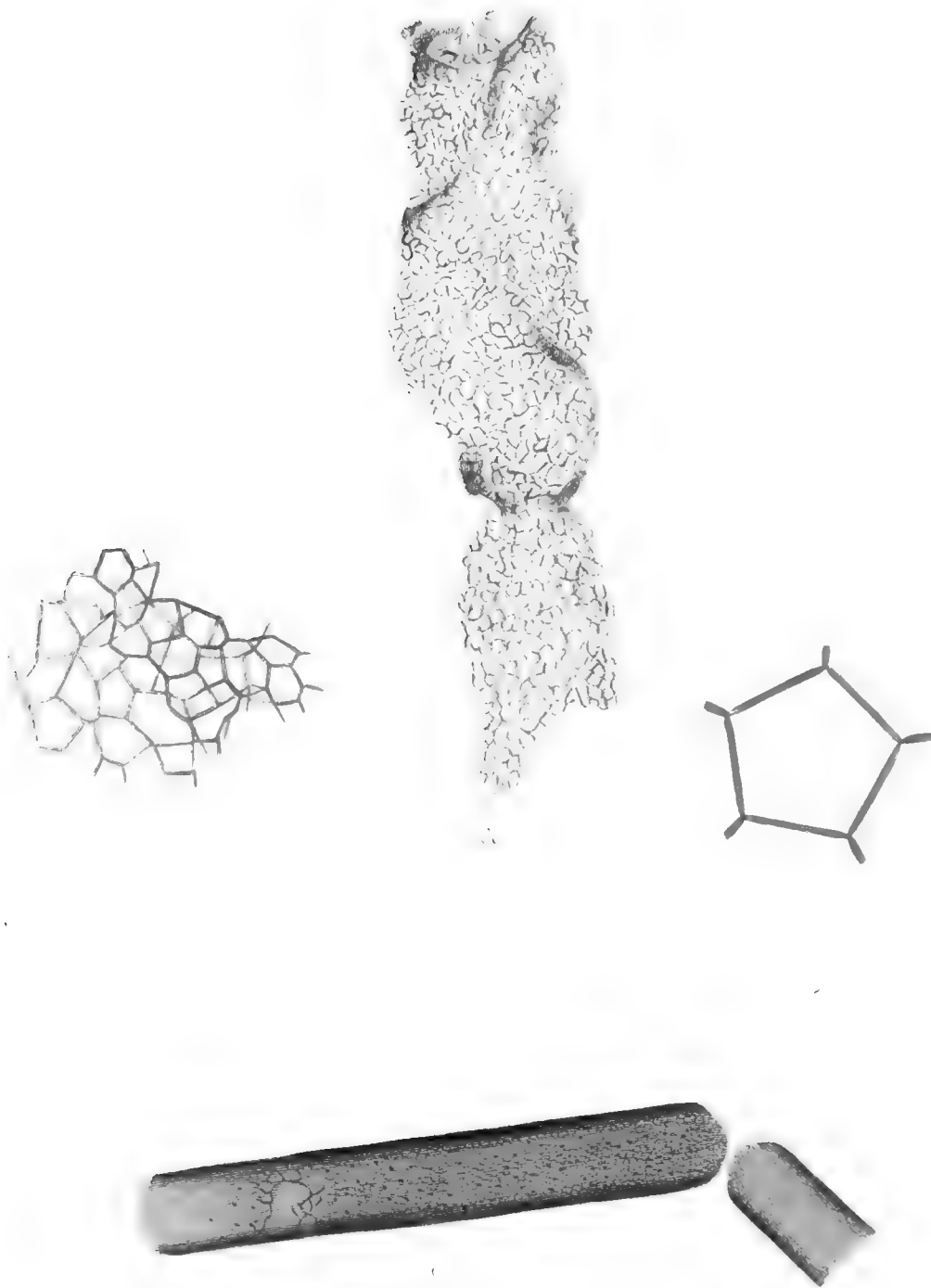
such an appearance originating from the union of the ends of two of the filaments, each of which becomes geniculate at the beginning of the connection, and these ends are most commonly nearly of the same length. Other parts of the filaments are also frequently and sometimes repeatedly connected with each other, in the same manner, and I have seen some which at first sight bore a striking resemblance to a mesh of *C. reticulata*. I feel myself at a loss even to offer a conjecture on the nature of this singular union of the filaments, and can only remark that they do not appear to effect any alteration in the interior of the joints, as is the case with *C. jugalis*, *bipunctata* and their congeners. When the juices have a little collapsed by drying, the tubular structure may be readily observed.

C. mirabilis, in drying, adheres to both glass and paper.

A. *C. mirabilis*, natural size.

B. Ditto magnified 3.

C. Ditto ditto 1.



Cladonia cristallina

CONFERRA RETICULATA.

C. filamentis anastomofantibus, reticulatis in maculas sub pentagonas coadunatis.

C. reticulata. Sp. Pl. p. 1635. Fl. Ang. p. 596. With. IV. p. 132. Eng. Bot. t. 1687. Ray Syn. p. 59. Dill. Musc. p. 20. t. 4. f. 14. Hall. Hist. p. 2119. Pluk. Phyt. t. 24. f. 2. Morrifon Hist. Oxon. III. p. 644. Sec. 15. t. 4. f. 4.

Hydrodictyon majus. Roth. Cat. Bot. II. p. 238.

H. tenellum. Roth. Cat. Bot. II. p. 239.

H. utriculatum. Fl. Germ. III. pars I. p. 531. Cat. Bot. III. p. 322.

H. pentagonum. Vaucher Conferves d'eau douce. p. 88. pl. 9.

In Ditches and Ponds, about Hounslow, *Hudfon*. In the Cam and Pool of the Botanic Garden at Cambridge. *Relban*. Heigham, near Norwich, *Mr. Pitchford*. In the Stream near Low Hall, Walthamstow. *E. Forster, jun.* Ditches at Woburn and Apsley. *Dr. Abbot*. Ditches at New Hall, near Kenfield, Suffex. *Mr. Borrer*. Thorpe, near Norwich. *Mr. S. Wilkin*.

ON the same morning I received fresh specimens of the present singular species from my friends the Rev. J. Davies and W. J. Hooker. The former gathered it in the Pool of the Botanic Garden at Cambridge, and the latter sent it me from the neighbourhood of Norwich, where it was gathered by Mr. S. Wilkin. It floats in irregular masses on the surface of Ponds and Ditches, and though it has been discovered here and there in different parts of this kingdom and of the Continent, yet its known *loci natales* are comparatively so few that it must be reckoned among the rarest of the fresh water Conserve, as the species

has been long well known to botanists, and the singularity of its structure precludes the possibility of its ever having been confounded with any other. The whole plant forms an oblong net-like tube, varying from a few inches to a foot in length, and from half an inch to two inches in diameter; being all formed of meshes which are most usually pentagonal, but some are composed of four and some of six sides. Each side is formed by a single joint which branches in a dichotomous and almost divaricated manner at each end, so that these branches assist in forming other meshes. The joints are cylindrical, and vary greatly in the same plant, some being twice as large as others, and the breadth varies proportionably from the size of human to that of the thickest horse hair. Respecting the propagation of this species I cannot do better than copy the result of M. Vaucher's observations; they are so extremely curious and interesting that I earnestly recommend them to the notice of such botanists as reside in the neighbourhood in which the plant grows, and shall only add that I long hesitated to give them credit, but confess that the few observations which my opportunities have allowed me to make tend strongly to confirm them.

“ Enfin, le 24 Germinal j'arrivai à ce but tant désiré, et je vis d'un seul coup d'œil, toute la reproduction de l'hydrodictye. Chacun des cinq filets qui forment le pentagone commença à se renfler légèrement, sur tout à ses extrémités. Ensuite il s'en sépara, non pas par une rupture proprement dite, mais en sortant de l'intérieur de la membrane dans laquelle il était contenu, et qui sans doute s'était ouverte; et après cette séparation, il flotta dans l'eau sous la forme d'un bâton cylindrique. Bientôt il s'aplatit, et éprouva une altération que je comparerai à celle qu'un commencement de fusion produit sur les métaux; ensuite il s'agrandit insensiblement dans tous les sens, et les mailles dont la réunion le constituait s'étant écartées les unes des autres, il devint lui même un nouveau réseau que l'on distinguait au microscope. Bientôt ces mailles purent être observées à la vue simple, et enfin chaque bâton fut totalement changé en un réseau entièrement semblable à celui dont il faisait partie. Toutes ces transformations s'opérèrent dans l'espace de quelques jours, et au bout de deux ou trois mois les jeunes réseaux avaient acquis toutes les dimensions dont ils

étaient susceptibles. Quoique je n'eusse aucune doute sur ce mode de reproduction, je n'ai pas laissé de le suivre pendant les deux années qui se sont écoulées depuis ma première observation. J'ai donc vu ces réseaux qui étaient nés dans l'an VIII. se conserver pendant tout l'été sans reproductions nouvelles et ensuite de développer au printemps de l'an IX, comme les autres s'étaient développés l'année précédente, et au moment où j'écris (1^{re} Floréal, an X,) quoique le printemps ait été extraordinairement sec, et que le fossé où vit l'hydrodictye soit entièrement privé d'eau les filets que j'y ai recueillis, et que j'ai rapportés chez moi ne sont pas moins développés comme les autres années. Voilà donc une exemple d'emboîtement peut-être plus remarquable que tous ceux qui, jusqu'à présent ont été observés. En effet il n'est guères permis de mettre en doute que si les côtés des mailles du réseau de l'année précédente, étaient les réseaux de cette année, les côtés des mailles des réseaux actuels sont aussi les réseaux de l'année prochaine, que chaque fibre de ces mailles est elle-même le réseau qui se développera dans deux ans, et que chaque fibrille de la fibre principale fera le réseau qui se développera dans trois ans, et ainsi de suite, jusqu'à ce qu'il plaise à l'auteur de la nature de mettre fin à ce développement en détruisant l'espèce qui le présente."

In drying, *C. reticulata* adheres, though not very firmly, to either glass or paper.

- A. A. *C. reticulata*, natural size.
- B. A mesh of ditto magnified 5.
- C. A joint of ditto ditto 1.



CONFERVA CORALLINA.

C. filamentis, ramosis, dichotomis, lubricis; diffeminentis contractis, articulis furfum incrassatis, longis, sub-pyriformis; fructu involucri polyphyllo subtenso.

C. corallina, Fl. Scot. p. 988. With. IV. p. 136. Roth. Cat. Bot. III. p. 225. Eng. Bot. t. 1815.

C. corallinoides, Sp. Pl. p. 1636. Fl. Ang. p. 598.

C. geniculata. Ellis in Phil. Transf. LVII. p. 425 t. 18. f. f. F.

C. marina gelatinosa, corallinae instar geniculata crassior. Dill. Hist. Musc. p. 33. t. 6. f. 36.

Corallina confervoides gelatinosa alba, geniculis crassiusculis pellucidis. Dill. in Ray. Syn. p. 34.

On rocks and stones in the sea. At Cockbush, Sussex, and Ynys y Mech, near Bangor, *Dillenius*. Brighton, *Ellis*. Anglesea, *Rev. H. Davis*. Weymouth, *Mr. Stackhouse*. Hartley, Northumberland, *Mr. Winch*. Cowes in the Isle of Wight.

THIS beautiful species may be found on several parts of our coasts during the summer months, but is by no means of general growth. When not expanded in water it forms a gelatinous slippery mass. The color when the plant is in perfection is a bright transparent pink, not unmixed with scarlet, but with age or exposure to the sun becomes lighter, and often tinged with green. The root is fibrous, and throws out many filaments, which are repeatedly divided with regular dichotomies, and vary in length from three to six inches. In proportion to the length the filaments are thicker than in any of its congeners with which I am acquainted, being about half a line in diameter. The joints,

as Dr. Smith observes, are nearly pear-shaped, being much swollen towards the apex, and about thrice as long as broad. Mr. Borrer, whose opinion in all matters relating to cryptogamous plants is entitled to great deference, informs me that the fructification "consists of a mass of seeds not enclosed in any membranous capsule whatever, but immersed in a jelly, sometimes forming a whirl in the contractions of the filament, and sometimes a lateral knob in the same situation." * The specimens which I gathered at Cowes produced an abundance of both whirled and lateral fruit, but the result of a long investigation which I gave them, differed widely from the foregoing. The lateral knobs appeared to be perfect capsules, round all of which a transparent limbus was readily observable, and I saw seeds escape from the apex of one precisely as in *C. rubra*, and the generality of the marine species. In some plants the capsules seemed to be composed of three or more cells, resembling those of *Euphorbia*, and I thought I observed some of the whirls to be formed by a number of similar cells disposed round the dissepiments, and thus forming a kind of polylocular capsule. Though the shape and appearance of these whirls differed materially from each other, I never doubted that they were true capsules till I received Mr. Borrer's letter; and I am certain that a well defined pellucid limbus surrounded all that I examined, though frequently the seeds and mucus which had escaped so adhered to the outside of the capsule as almost to cover it, and had I not been well acquainted with that gentleman's accuracy, I should have imagined that this circumstance had deceived and induced him to believe that no seed vessel existed. The whirled and lateral fructification are sometimes, though not generally found on the same plant, and both are always subtended by an involucre of several obtuse, jointless, incurved leaves. This production of different kinds of fruit is far from being confined to *C. corallina*. I am informed that three have been discovered on *C. fetucea*, which is nearly allied to the present species, and Mr. Borrer remarks, "I should not be surprized by any variety of fructification in the marine algæ, having myself found on *Fucus pinastroides* no less than four kinds." Respecting the red granules

* See Eng. Bot. t. 1815.

which I have above called seeds, he adds, " In some specimens they were oval, and in appearance solid; in others globose, and seemingly divided into three, and unless I am very much mistaken, each seed in either case had a pellucid limbus." Mr. Hooker, who examined some specimens which were nearly fresh, could not discover any limbus, and he is of opinion that the seeds (commonly so called) of both fuci and confervæ, which have a limbus, are in fact capfulæ. I confess that the microscope I used in the Isle of Wight, was neither so good or convenient as that which I commonly use, and therefore I much more doubt my own correctness than Mr. Borrer's, more especially as he has had frequent and much better opportunities of studying this species than myself. My observations as before related afforded me no room to doubt, that the nature of both the whirled and lateral fructification is similar to that of Roth's *Ceramia*; but if Mr. Borrer's observations and Mr. Hooker's ideas are correct, the fructification consists of minute capfulæ immersed in a loose transparent jelly, without any case or covering.

In drying *C. corallina* loses much of its color, and adheres firmly to either glass and paper.

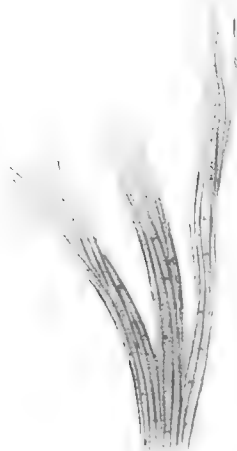
A. *C. corallina*, natural size.

B. D° with lateral fruit magnified 4.

C. D. D° d° 2.

E. whirled fruit d° 2.

N. B. C. D. and E. were completed from fresh specimens in the Isle of Wight.



CONFERTA VAGINATA.

C. filamentis ramosis cylindricis geniculatis cœruleo viridescens, ramis vaginato-fasciculatis, articulis brevissimis

Oscillatoria vaginata. Vaucher Histoire des Conferves d'eau douce. P. 200. tab. 15. f. 13.

C. velutina β. Roth. Cat. Bot. III. p. 200?

Frequent during the Winter months on damp soil, by the sides of paths, &c. about West Town, Suffex. *Mr. Borrer.* On Earth in the Flower-pots in a Green-house at Norwich. *Mr. Hooker.* On Rocks and Stones in the Stream which runs through the Wood at Penllergare, near Swansea.

I DISCOVERED this singular species, growing mixed with *C. decorticans*, on stones which are occasionally overflowed by the stream, and also entangled among the filaments of *C. fluviatilis*, and the leaves of *fontinalis antipyretica*, in the neighbourhood of Penllergare. My friends Mr. Hooker and Mr. Borrer inform me, they also have found it in their respective neighbourhoods, but in situations so dissimilar, that the plant seems to possess a perfect indifference with respect to the soil or place in which it grows.

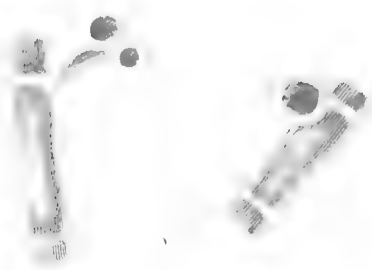
Though Vaucher in the drawing of this plant has not availed himself of the higher powers of the microscope, his figure and description are too clear to admit any doubt of its being his *Oscillatoria vaginata*. It may be well to remark that this author has formed *limosa*, *fontinalis*, and their congeners with short annular joints into a separate genus, which he has placed among the Tremellæ, and given it the name of *Oscillatoria*, from a spontaneous motion that he supposes them to possess. Of the nature of this motion I have already hazarded an opinion in the description of *C. limosa*, and these plants, both in structure and

appearance, so entirely accord with the *Conservæ*, that I confess myself surprised at their having been removed by that able author to the *Tremellæ*, to which they seem to bear a far less affinity. As Dr. Roth says he could not discover any sheath in his variety of *C. velutina*, to which he refers Vaucher's *C. vaginata*, I have thought it right to quote it as a synonym with a mark of doubt.

C. vaginata grows in small tufts, of which the diameter of the largest that I have gathered does not much exceed a quarter of an inch, and the greater part of them are in fragments of a still smaller size. The filaments are cylindrical, and resemble those of *C. limosa*, except that they are branched, and that they are enclosed in bundles within a membranous sheath, which is so peculiar to this species that it is alone sufficient to distinguish it from every other I am acquainted with: these sheaths are themselves branched or divided repeatedly into smaller ones, at irregular distances of various sizes; they are narrowest at their origin, and become swollen upwards, as the filaments increase by branching, so as sometimes to resemble a series of *Cornucopiæ*. The ends of the filaments which are of various lengths project beyond the ultimate division of the sheath, and they are sometimes curiously coiled round each other. It appears probable that this species is propagated by the separation of the different divisions of the sheath, each of which may thus form a distinct and perfect plant, and Vaucher goes so far as to suppose that every individual filament at length becomes an envelope for other filaments which are generated within them.

In drying, *C. vaginata* adheres, though not firmly, to either glass or paper, and when dried, may be revived by immersing it in water.

- A. *C. vaginata*, natural size.
- B. Ditto magnified 3.
- C. Piece of ditto, magnified 1.
- D. Ditto, larger than it appeared in the microscope.



Cynoptera - Tanager

CONFERVA TURNERI.

C. filamentis pinnatis fasciculatis; primis oppositis sub-simplicibus; articulis longis dissepimentis pellucidis; capsulis in pinnis infra medium secundis, pedunculatis, globosis.

Ceramium Turneri. Roth. Cat. Bot. III. p. 128. Tab. 5.

On Fuci and Corallines in the Sea at Cromer. *D. Turner, Esq.*

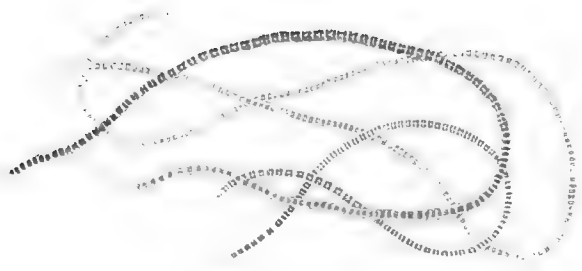
THE present species was first discovered some years ago by my friend Mr. Turner, and was communicated by him to Dr. Roth, who named it in honor of its discoverer, and published a description in the third Fasciculus of his *Catalecta Botanica*, with a good drawing from the accurate pencil of Professor Mertens. The species which has subsequently been figured in English Botany under the same name, is the *C. plumula* of Ellis and of this work.

C. turneri is found in great abundance on fuci and corallines in the sea at Cromer, during the summer months, and from its elegant growth and delicate rose color, may be considered one of the most beautiful of the *Confervæ*. Its habit is bushy, forming thick tufts. The filaments rarely exceed an inch in length, and are undivided, but beset with opposite and mostly simple pinnæ, from four to six lines long, between patent and horizontal, which are sufficient readily to distinguish this species from *C. rosea*, to which in appearance it is most allied. The length of the joints is about thrice greater than their diameter, and they are perfectly colorless at their dissepiments. The capsules are numerous, globose, mostly raised on short footstalks, and arranged together on the upper side of the lower pinnæ: though in general solitary, it occasionally happens that two are supported on the same peduncle.

For the drawing I am obliged to my friend William Jackson Hooker, Esq. to whom for many other valuable communications this work is also greatly indebted.

In drying it adheres to both Glafs and Paper.

- A. *C. turneri*, natural size.
- B. Ditto, magnified 4.
- C. Ditto, ditto 3.
- D. Ditto, ditto 1.



Corynebacterium parvum

CONFERRA ATRO-PURPUREA.

C. filamentis simplicibus, ætate hic illic inæqualiter torosis, atro-purpureis; articulis diametro dimidio brevioribus, fungulis feriem dupliciem globulorum includentibus.

C. atro-purpurea. Roth, Cat. Bot. III. p. 208. t. 6.

Bantry Bay, Ireland. *Miss Hutchins.*

C. atro-purpurea was first discovered growing upon mill-wheels, in the vicinity of Bremen, and communicated to Dr. Roth by Professor Mertens. Miss Hutchins has lately gathered it in Bantry Bay, and from her, through the medium of our mutual friend, Mr. Turner, I have received specimens of this, as well as of several other species at present undescribed; an account of which I should have been happy to publish, had they not suffered too much change in drying. The present is one of the few *Confervæ* that may be restored by immersion in water, and I have therefore ventured to make the annexed drawing from a dried specimen.

The root is fibrous; the filaments grow in small tufts, they are about two or three inches in length, thinner than human hair, nearly straight, of a glossy hue, and dark purple color. As in *C. fusco purpurea*, when the plant is young the filaments are most probably of an uniform thickness, and they are so described by Dr. Roth, but those now before me are in some parts swelled, and much thicker than in others; the dissepiments are narrow and pellucid; the joints are in length but about half equal to their diameter, and each contains two rows of granules disposed transversely, which, like those of *C. bipunctata*, occasionally take a stellated appearance. A longitudinal pellucid line is observable

running through the middle of some filaments, and in others the bands of granules are divided in like manner into three or four separate compartments.

C. atro-purpurea is very closely allied with *C. fusco-purpurea*, but in that species there is only a single band of granules in each joint.

In drying it adheres to both Glass and Paper.

A. *C. atro-purpurea*, natural size.

B. Ditto, magnified 2.

C. Ditto, ditto 1.

CONFERVA EBENEA.

C. filamentis ramosis, erectis, cæspitosis, brevibus, rigidis, sub-cartilagineis; ramis ramulisque obtusis; articulis diametrum longitudine æquantibus; dissepimentis contractis.

Conferva nigra. Roth, Cat. Bot. III. p. 299.

Byssus nigra. Fl. Ang. p. 606. Fl. Scot. p. 1003. With. IV. p. 144.
Fl. Germ. III. pars I. p. 567.

Byssus petrea nigerrima fibrosa. Dill. Hist. Musc. p. 9. t. 1. f. 18.

Byssus minima faxatilis nigra ramosissima, &c. Micheli. Gen. Plant. p. 212.
Tab. 90. f. 5. & *Byssus cæspitosa nigra, &c.* p. 211. Tab. 90. f. 7. ejusd. lib.

Byssus nigra velutina. Hall. Hist. p. 2104.

On Rocks and Trees. *Dillenius.*—On Rocks in the Highlands. *James Brodie, Esq.*—On the Stump of a Tree in Mackbeth's Wood, at Brodie, near Forres, N. B. *W. J. Hooker, Esq.*—On Birch Trees, at Costefy near Norwich. *Mr. S. Wilkins.*

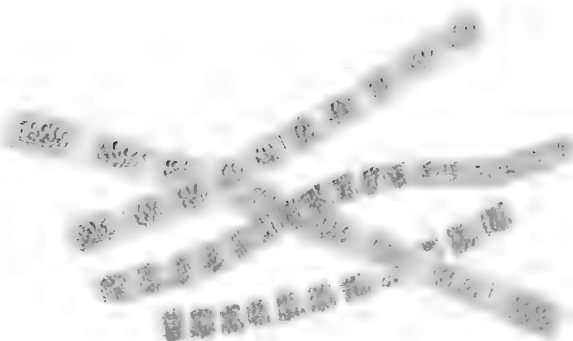
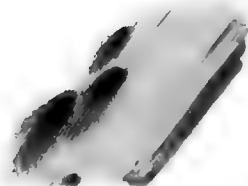
C. EBENEA, accompanied by the accurate drawing, which is represented in the annexed plate, was obligingly communicated to me by my friend Mr. Hooker, who, in company with Mr. Turner, gathered it near Forres, in Scotland. Authentic specimens with which I have been favored by Sir Thomas Frankland and the Rev. Hugh Davies, prove that Hudson's *Conferva nigra*, respecting which I had previously been accustomed to yield to the generally received opinion of its being the same as *Fucus fruticulosus*, is in reality the *C. atro rubescens* of this work. In consequence of this it became necessary to change the name given to the species here figured by Dr. Roth, who in the third Fasciculus of his *Catalecta Botanica* has, with great propriety, removed the plant from the *Byssi* to the *Conservæ*, but has retained the specific name of

the Flora Anglica, in the place of which I have adopted a nearly similar appellation, proposed by my friend Sir Thomas Frankland.

C. ebenea grows on rocks and trees in thick black tufts, together forming patches of various sizes, but it is not by any means a common species. Mr. Turner tells me that at a little distance the patches look like small spots of foot. The filaments I believe never exceed three or four lines, and are most frequently considerably less than a line in length; their substance is stiff, somewhat horny, and their growth erect: they are about twice branched in a sub-dichotomous manner, and the branches are irregularly beset with simple patent ramuli with obtuse apices. The dissepiments are opaque, more or less contracted, and divide the filaments into joints, of which the length about equals their thickness. No fructification has been discovered.

In drying it adheres but very slightly to either Glass or Paper.

- A. *C. ebenea*, natural size.
- B. Ditto, magnified 3.
- C. Ditto, ditto 1.



Corymbus (Corymbus)

CONFERRA YOUNGANA.

C. filamentis cæspitosis, simplicibus, rigidiusculis, apicibus obtusis; dissepimentis contractis; articulis breviusculis, adultioribus subnodosis; fuccus in globulos solitarios demum congestus.

On the Lime-Stone Rocks near Dunraven Castle, Glamorganshire. *W. W. Young*.—On the Piles of the Jetty at Great Yarmouth, and Cromer, Norfolk. *W. J. Hooker*, Esq.

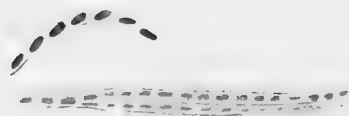
THE present species was first discovered by Mr. William Weston Young, A.L.S. in honor of whom I have named it, as a token of my private friendship, and as a public acknowledgment of the assistance which this work has received from his accurate pencil.

C. youngana grows very plentifully on the limestone rocks about Dunraven, frequently in such places as are never covered by the sea, and only washed by the spray at high water; and Mr. Young tells me that it never grows much lower than high water mark, or where it is not left exposed to the air during the greater part of the day. The situations in which Messrs. Turner and Hooker have found it at Yarmouth and Cromer are in this respect similar. It forms elegant little tufts, usually about a quarter of an inch in length, and of a dark green color. The filaments are simple, somewhat rigid, obtuse at the apices, and when the plant is at maturity they become contracted at each dissepiment. The length of the joint varies considerably in different filaments, being sometimes only equal to and at others double the diameter. In the young plants these joints are nearly of the same color throughout, but with age they become more pellucid towards the dissepiments, and at length the green matter collapses into a globule which sometimes disappears, and leaves the filaments perfectly colorless.

In drying C, youngana adheres to Paper, but not at all firmly to Glafs.

A. C. youngana, natural fize.

B. Ditto, magnified 1.



C.

Conferva patula.

CONFERVA FŒTIDA.

C. filamentis ramosis, flaccidis, virgatis, coadunatis, apicibus liberis; ramis confertis sub-dichotomis; dissepimentis obsoletis, articulis longiusculis granula elliptica solitaria includentibus.

Ulva fœtida, Vaucher. Histoire des Conferves d'eau douce. p. 244. t. 17. f. 3.

Stagnant Pools in the Salt Marshes at Cley, Norfolk; *Mr. Hooker*. Bantry Bay; *Miss Hutchins*. Among the Rocks near low water mark, under the Mumbles Light-House, Glamorganshire.

IN the early part of last June I discovered this curious production of nature, growing under the Mumbles Light-House, in a pool left by the tide, near low water mark, where, had not the tide receded unusually low, it would not have been exposed to view. This I at first supposed to be its natural situation, and the cause of its not having been previously discovered, but I have since learnt that Mr. Hooker had gathered it two months before, in the salt marshes above mentioned, and had ascertained it to be the plant described and figured by Vaucher. *C. fœtida*, therefore, seems to possess an unusual indifference with respect to its place of growth, for, he says, “Elle se rencontre dans tous les eaux fraîches et courantes des petits ruisseaux.” I have not ventured on introducing it as a vegetable without considerable hesitation, on account of its strong peculiar oily* smell, resembling that of some of the zoophytes, but the eye, even when assisted with the highest powers of a microscope, cannot discover any

* The remark made by Vaucher upon the smell of this plant, agrees almost exactly with what I had observed before I had any idea of my plant being the same as his. He says, “L’odeur qu’elle répand est très forte, et ressemble aux odeurs animales et surtout à celle des corps qui commencent à entrer en putréfaction.”

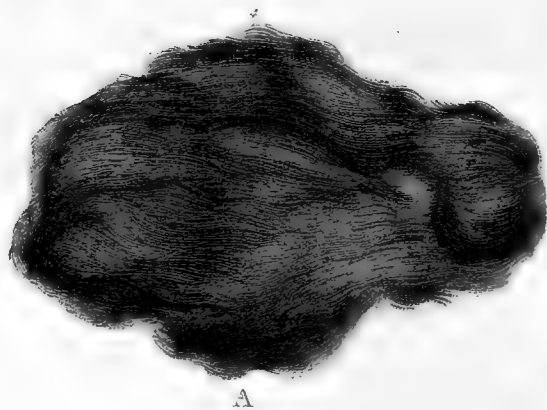
appearance at all sufficient to distinguish it from the tribe with which it is now arranged.

C. foetida grows in thick bushy tufts, near two inches in length and of a dull olive color. At first sight it very much resembles *C. littoralis*, but when examined under a glass it differs entirely from this and every other species with which I am acquainted. The root appears to be a very minute callus, from which numerous short creepers are thrown out, but it is so small as to be hardly observable. The filaments are very flaccid, and peculiarly slender in proportion to their length; they are twice or thrice branched in an irregularly dichotomous manner, and in their adhesion to each other resemble those of *C. vaginata*, but there is not any appearance of a sheath. The branches at their base, and frequently through nearly their whole length are closely united to the stem, in the same manner as are the main filaments to each other, being separated only at the extremities, which gave cause to Vaucher's making it a part of the specific character, "*extremitatibus multoties divisis*". The length of the joints is nearly double the diameter, each joint contains an egg-shaped mass, resembling those of *C. jugalis*, which, from analogy, I suppose are formed by a collapion of their juices, or internal granules, and are somehow connected with the fructification, as supposed by Vaucher, but like him I have had no opportunity of investigating the matter.

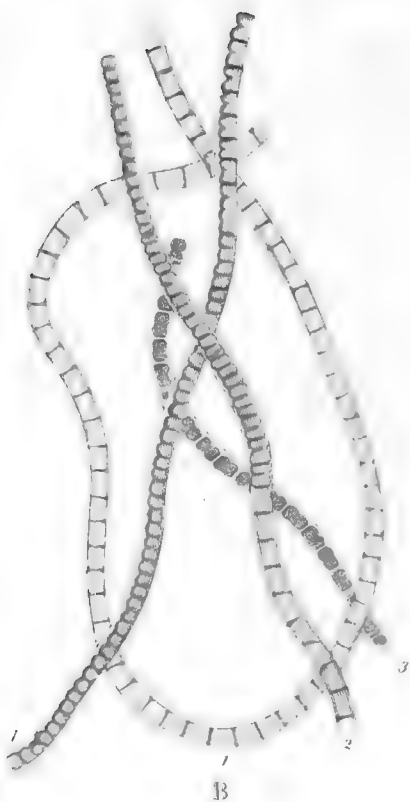
Villars's *C. foetida* may possibly be the same plant as is here figured, but neither from his description nor his figure is it possible to decide upon the subject, and I have therefore not quoted him.

This species adheres to both Glass and Paper.

- A. *C. foetida*, natural size.
- B. Ditto, magnified 2.
- C. Ditto, ditto 1.



A



B



C

Conferva bipartita

CONFERRA BIPARTITA.

C. filamentis simplicibus, tenuibus, longissimis, densissime compactis, flavo virentibus; articulis diametro sub triplo longioribus denum bipartitis.

In small Pools on the Bogs on Town Hill Common, near Southampton. *Air. Woods.*

In the Ditches between Pontardylais and the Sea, Carmarthenshire.

THE present species almost fills the ditches in the marshes between Pontardylais and the sea, and I cannot find that it has been heretofore described. It floats on the surface of the water in large densely matted masses, of a yellowish green color, and retains air bubbles in the same manner as those species which were formerly confounded together under the name of *C. bullosa*. The filaments are very long, unbranched, and in thickness rather exceed those of *C. rivularis*. The length of the joints is usually from three to four times their diameter. At a certain age the interior of each joint separates by a transverse division in the middle, into two vesicles, which at length contract and become rounded at the corners. In figure B, the filament marked No. 1 is in its youngest state: in the lower part of No. 2, the transverse separation of the joints has just commenced, and it is seen in the different stages of advancement towards the upper end of the same filament and in No. 3. These internal vesicles when thus contracted are sometimes disposed, as is represented at No. 4, and it frequently happens that the division has commenced at one side of the filament and not on the other. The plant figured at C grew in the same place and manner with the foregoing, and could only be distinguished by the microscope. I found the filaments of both mixed with each other, and the joints of many were so intermediate as to prove that both belong to the same species.

C. bipartita may be distinguished from *C. fordida* by the smaller and remarkably pellucid filaments of the latter, as well as by their more simple internal structure. From *C. rivularis* it may be known by its different color and mode of growth, and by its longer joints with two vesicles in each. Both these species however vary, and occasionally approach each other in a surprising manner, and no other Confervæ have ever puzzled me so much. I have gathered *C. rivularis*, in some of the filaments of which there has been a pellucid line running longitudinally through them, as if they were about to separate in that direction. It also frequently happens that the coloring matter in the joints of that species is collapsed alternately on both sides of the filament, so as to present a curious zic-zac appearance, and I once saw the internal vesicles of *C. bipartita* arranged in the same manner.

In drying it adheres, though not so firmly as *C. rivularis*, to either Glass or Paper.

- A. *C. bipartita*, natural size.
- B. Ditto, magnified 1.

CONFERVA ACHARII.

C. filamentis ramosis, cæspitosis, rigidiusculis, sub-erectis, fragilibus, fusco-olivaceis; ramis brevibus, patentibus, apicibus obtusis; articulis longiusculis.

C. Acharii. Weber & Mohr, reife durch Schweden, p. 104. t. 1. f. 6. Roth. Cat. Bot. III. p. 298.

Parmelia velutina. Acharius Methodus Lichenum. II. p. 245.

On shady Banks in the neighbourhood of Norwich, not uncommon. *W. J. Hooker, Esq.*

WE are indebted to Mr. Hooker for the present addition to the British Flora, he having discovered it growing plentifully among the moss on shady banks in the neighbourhood of Norwich, and by comparing it with authentic specimens proved that it is the *C. Acharii* of the above mentioned German authors. It forms strata several inches in circumference of an olive brown color, by which it may be at once distinguished from *C. velutina*, which it most resembles in its mode and place of growth. The filaments grow nearly erect and matted together; their nature is rather brittle, and each has rarely more than one branch, which is short, patent and very obtuse. The length of the joints is nearly equal to double the diameter. The fructification has not been discovered.

C. Acharii may be distinguished from *C. othotrichi* by its far different color; by its place and mode of growth; by its filaments which are much less branched, and by its shorter joints.

In drying it adheres to neither Glass or Paper.

A. *C. Acharii*, natural size.

B. Ditto, magnified 3.

C. Ditto, ditto 1.



Cor. a. p. p.

CONFERVA HOOKERI.

C. filamentis primariis inarticulatis, ramulis pinnatis, tenuibus, flexuosis, undique sparsis, pallide rubro-fuscescentibus; pinnulis alternis articulatis; articulis diametro sesquialongioribus.

On Rocks in the Sea at Cawfie, Murrayshire; *Mr. Hooker* and *Mr. Borrer*.
Holyhead; *Rev. Hugh Davies*. Bantry Bay; *Miss Hutchins*.

I HAVE been favored with a specimen of this plant gathered by the Rev. Hugh Davies, and which was marked by Hudson "*C. albidula*." The specimen in the Dillenian Herbarium according with Hudson's reference is however very different, and agrees better with both the name and description of that species.

Mr. Hooker favored me with the present drawing from a specimen which he gathered during his late tour through Scotland, and I have a pleasure in embracing the opportunity it affords me of thus acknowledging the great assistance which I have received from him, by distinguishing it with his name.

C. Hookeri grows to the length of two or three inches, and whilst recent has a remarkably gelatinous appearance. The color is a pale reddish brown. The principal stems are entirely destitute of dissepiments, and are of an unequal thickness, so that if examined separately they might be mistaken for an *Ulva*: they are however beset with pinnated, flexuose, jointed ramuli, and which are remarkably slender in proportion to the thickness of the stem: the pinnulæ are alternate. The length of the joints is about half greater than the diameter. The capsules are nearly globular and of the same nature with those of *C. rosea*. It is in size and mode of growth nearly allied to *C. arbutula*, but differs in its color, in being branched throughout its whole length, in having pinnated instead of multifid ramuli, and in the shape and disposition of its capsules.

In drying it adheres firmly to both Glafs and Paper.

- A. C. Hookeri, natural fize.
- B. Ditto, magnified 3.
- C. Ditto, ditto 2.
- D. Ditto, ditto 1.



Conjerva Bredieri.

CONFERRA BRODIÆI.

C. filamentis ramosissimis venosis purpureo-nigrescentibus; ramis elongatis, ramulis sparsis, patentibus, fasciculatis, multifidis; articulis ramorum obsoletis, ramulorum diametro sub-longioribus.

Rocks in the Sea. Near Forres; *James Brodie, Esq.* Bantry Bay; *Miss Hutchins.* At Falmouth; *Mr. Turner.* At Seaton, Devon; *Mr. Griffiths.* Sometimes thrown on the shore at Dover.

OF this species I first received specimens from Mr. Brodie, and have named it after him as an acknowledgement of the kind attention with which he has honored me, and of the assistance which he has given to this work.

C. Brodiæi is among the most magnificent of the genus, often extending to a foot and a half or two feet in length, and pushing forth from a discoid base several main filaments as thick as small twine and of a blackish purple color. These are beset with scattered branches of uncertain length, which arise in a direction between horizontal and patent: along the branches at irregular intervals clusters of slender ramuli are disposed, from a quarter to half an inch long, multifid in a sub dichotomous manner, and acuminate at their apices. The whole of the branches and ramuli are of rich deep red-brown color when fresh, but turn black on drying, and are always strongly marked with dark longitudinal veins. The capsules are ovate, sessile, and plentifully scattered over the ultimate ramuli, sometimes on their sides, and sometimes at the axillæ of the divisions. Besides these *C. Brodiæi*, in common with most other of the marine species, presents what is usually considered as another kind of fructification, consisting of sphaerical globules imbedded in the ultimate ramuli, but of their real nature I confess that I am unable to satisfy myself.

The whole of the plant is remarkably thick and bushy, and its mode of growth flexuose, by which, with its peculiar color, it may be readily known from its congeners. Neither the main stem or principal branches shew any appearance of dissepiments, but in the ramuli they are very striking, and divide them into joints whose length and diameter are nearly equal.

The drawing here represented was made by Miss Hutchins from a fresh plant, and by her communicated to my friend Mr. Turner.

In drying it adheres but very slightly to Paper and not at all to Glass.

- A. *C. Brodiaei*, natural size.
- B. Ditto magnified 4.
- C. Ditto ditto 3.



Conferia Hutchinsii.

CONFERVA HUTCHINSIÆ.

C. filamentis ramosissimis, flexuosis, sub cartilagineis, fragilibus, glaucoviridibus; ramis sparsis; ramulis sub secundis erectis, articulis torulosis, diametro duplo logioribus.

In Bantry Bay, not rare. *Miss Hutchins.*

I HAVE seen no specimen of this beautiful and striking species besides what I have received through the favor of my friend Mr. Turner from Miss Hutchins, by whose name I have had a peculiar pleasure in calling it, as I know few, if any Botanists, whose zeal and success in the pursuit of Natural History better deserve such a compliment. I am also indebted to her for the drawing here represented.

The color, according to Miss Hutchins, is a beautiful glaucous green, with changeable tints when fresh, and under the water appears almost white. The substance is rather stiff and approaches to cartilaginous. The root is a largish disk, giving rise to numerous clustered filaments from three to eight inches long, somewhat thicker than horse hair, of equal size from base to summit, flexuose, very much and irregularly branched; branches between erect and patent, loosely beset with others disposed in the same irregular manner, and these again with others; the ultimate ones are short, mostly simple, generally placed more on one side of the branch than on the other, and very slightly attenuated towards the apices. The length of the joints is uncertain even upon the same filament, but is about twice greater than the width; in the middle they are slightly torulose. No fruit has yet been discovered. It is however proper to observe that this description has been made with Mr. Turner's assistance from dried specimens, as I have not been able to obtain the plant in any other state.

C. Hutchinsæ approaches most nearly to **C. diffusa**, from which it differs in the greater size of its filaments and in the much shorter joints, which are not as in that species regularly cylindrical but constantly swollen in the center. The same characters, and still more its flexuose mode of growth, distinguish it at first sight from **C. rupestris**.

In drying it adheres slightly to either Glass or Paper.

A. **C. Hutchinsæ**, natural size.

B. Ditto, magnified 3.



Cladonia pinnatifida

CONFERVA PEDICELLATA.

C. filamentis dichotomo-ramosis, diffusis, rubris; ramulis alternis, multifidis, apicibus furcatis; articulis sursum incrassatis, diametro sub-quintuplo longioribus.

C. pedicellata. Eng. Bot. t. 1817. (malè).

On the Beach at Selfey and Brighton; *Mr. Borrer.* Bantry Bay; *Miss Hutchins.*

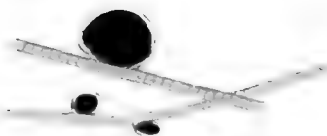
WE are indebted to Mr. Borrer for this elegant addition to the British Flora, he having first discovered it in Suffex, and I am not aware of its having been found by any other botanist except Miss Hutchins, to whom I am obliged, through Mr. Turner, for the present drawing, made by herself from recent specimens which she gathered on the shore at Bantry.

C. pedicellata grows about four inches in length, and is of a deep red inclining to rose color. The filaments are repeatedly divided with rather diffuse and dichotomous branches: the ramuli are alternate, and somewhat fasciculated with forked apices; in the specimens from Miss Hutchins they are obtuse in every part of the plant, and so are the lower ones of those from Mr. Borrer, but in these latter the uppermost are elongated and gradually attenuated towards their summits. The length of the joints is rather variable, but mostly about five times greater than the diameter, and excepting those which constitute the terminations of the ramuli, they are always thickest at the apices. The capsules are on short fruit stalks, joined at the base, ovate, solitary, and most frequently placed in the upper forks of the ramuli.

In drying it adheres to both Glass and Paper.

- A. *C. pedicellata*, natural size.
B. Ditto, magnified 3.
C. Ditto, ditto 1.

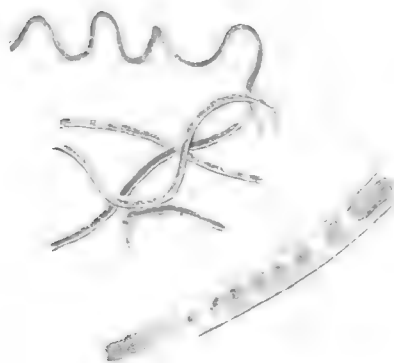
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C. deserticans



C. confervicola

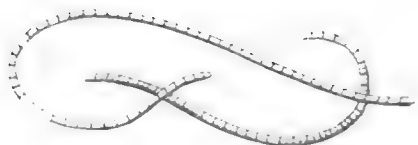


C. munda

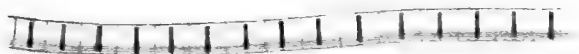


C. rivularis, 3.

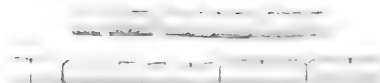




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U. faga. 2. 1. 1. 1.



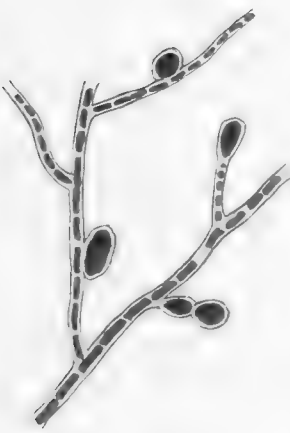
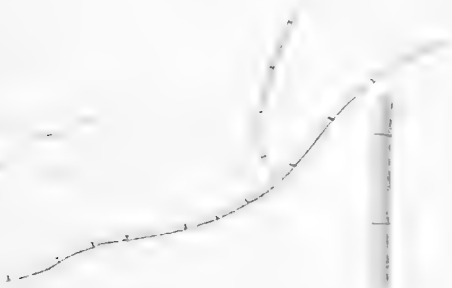
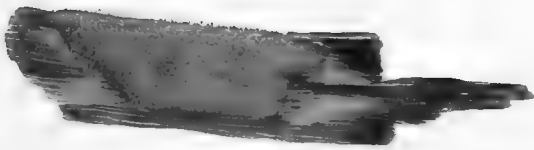
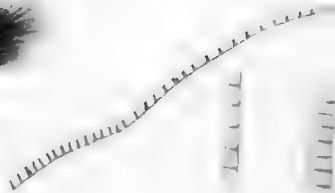
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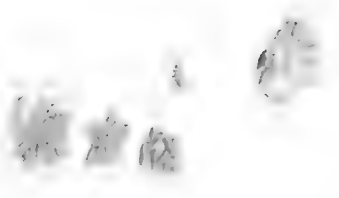
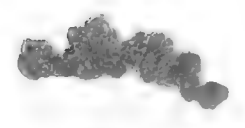
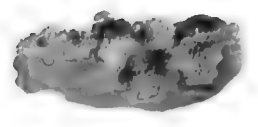


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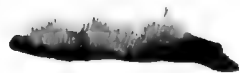
Q61



Q61









C. ericoides



C. ericoides



C. ericoides

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ERRATA.

Page 32, line 18, for T. 32 read T. 56.

— 37, — 2, for T. 43 read T. 41.

— 41, — 25, for *lubrica* read *lucens*.

— 50, — 27, for VAUCHER read *Conj. stellina*. VAUCHER. *Hist.*
des Conferves, p. 75. t. 7. f. 1.

— 61, — 23, for T. 89 read T. 69.

— 79, — 20, after T. add 100.

— 81, — 13, after T. add 107.

The numbers to five Plates in the fifth Fasciculus, were omitted by the Engraver;
they should stand as follows.

C. *stricta*. T. 40.

C. *amphibia*. T. 41.

C. *spongiosa*. T. 42.

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C. *polymorpha*. T. 44.

GIVE GOD
JOY IN BOOKKEEPING
HAND BOOK BY

HAND BOUND BY
TALIN BOOKBINDERY
CAPE COD

